Video Cassette Recorder Deck: Turbo Drive QUEEN volume

Service
Service
Service

VR171/02/13/16/58
VR175/02/05/13/16/39
VR276/02/39
VR277/02/05
VR475/02/16/39/58
VR476/39
VR477/02/39/58
VR675/02/05/16/39
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SB205/02
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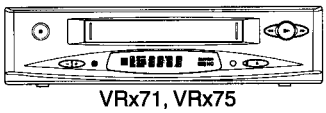
SB605/03/11/38
SB705/38
DV105/05
DV605/05
20DV7/39
25DV7/39
45DV7/39
65DV7/39
MV1971


VRx71, VRx75

VR276, VR476

VR277, VR477, VR676

SB100,SBx05

DVx05, xxDV7, MV1971

Service Manual

Evolution: AA

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Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

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PCS 77235 GB

Features

	VR171/02	VR171/13	VR171/16	VR171/58	VR175/02	VR175/05	VR175/13	VR175/16	VR175/39	VR276/02	VR276/39	VR277/02	VR277/05	VR475/02	VR475/16	VR475/39	VR475/58	VR476/39	VR477/02	VR477/39	VR477/58
Low power standby [W]										6		6							6		
PAL BG	✔	✔	✔		✔		✔	✔		✔		✔		✔	✔				✔		
PAL I for Ireland																					
PAL I for UK						✔							✔								
PAL BG DK, SECAM BG DK				✔													✔				✔
PAL BG, SECAM L/L`,SECAM BG									✔		✔					✔		✔		✔	
Splitter for France									✔		✔					✔		✔		✔	
Sound system: mono	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Sound system: stereo																					
Sound system: Nicam																					
FOLLOW TV (analog)										✔	✔	✔	✔					✔	✔	✔	✔
WYSIWYR (analog)										✔	✔	✔	✔					✔	✔	✔	✔
Cable tuner incl. S-channels	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔
Autoinstall (UK)						✔							✔								
Video heads:	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4
FM-audio heads (for stereo)																					
Winding time E180 [sec]	260	260	260	260	260	260	260	260	260	100	100	100	100	260	260	260	260	100	100	100	100
Rewind time E180 [sec]	170	170	170	170	170	170	170	170	170	100	100	100	100	170	170	170	170	100	100	100	100
Video Longplay [8 h](PAL/SECAM)						✔						✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Clever Turbo Drive										✔	✔	✔	✔					✔	✔	✔	✔
Tape counter: linear relative	✔	✔	✔	✔	✔	✔	✔	✔	✔					✔	✔	✔	✔				
Tape counter: linear (time used/left)																					
Tape counter: linear (time used)										✔	✔	✔	✔					✔	✔	✔	✔
VISS next/previous index search	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Frame advance	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔								
Field advance														✔	✔	✔	✔	✔	✔	✔	✔
Studio Picture Control	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
NTSC (non-standard) playback in color										✔	✔	✔	✔				✔	✔	✔	✔	✔
Number of events	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Sequential Programming	✔	✔	✔	✔	✔	✔	✔	✔	✔					✔	✔	✔	✔				
Parallel Programming										✔	✔	✔	✔					✔	✔	✔	✔
Daily/weekly					✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
GEMSTAR SHOWVIEW					✔		✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔
GEMSTAR VIDEOplus+						✔							✔								
OTR	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
VPS / PDC / VPS+PDC (VPDC)	VPS	VPDC		VPS	VPS	VPDC	VPDC		VPDC	VPDC	VPDC	VPDC	VPDC	VPDC		VPDC	VPS	VPDC	VPDC	VPDC	VPS
Record-prepared mode (from SCART 2)			✔		✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔
Backup of clock	30mn	30mn	30mn	30mn	30mn	30mn	30mn	30mn	30mn	7hrs	7hrs	7hrs	7hrs	30mn	30mn	30mn	30mn	7hrs	7hrs	7hrs	7hrs
Transm.identif. via VPS/PDC	✔	✔		✔	✔	✔	✔		✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔
Audio: Stereo/HiFi - bilingual																					
Audio Longplay [8 h]						✔						✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Audio dubbing																					
OSD with SANYO IC	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Child lock										✔	✔	✔	✔					✔	✔	✔	✔
16:9 (via Scart pin 8)																					
Audio out: cinch (rear)																					
Number of scart connectors	1	1	2	1	2	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2
VCR1/VCR2 selection																					
Synchro Time/Time and Date download						✔	✔		✔	✔	✔	✔	✔	✔		✔		✔	✔	✔	
Shuttle on front												✔	✔						✔	✔	✔

VR675/02	VR675/05	VR675/16	VR675/39	VR676/02	VR676/05	VR676/39	SB100/03	SB100/11	SB100/38	SB105/03	SB105/11	SB105/38	SB205/02	SB405/11	SB405/38	SB505/38	SB605/03	SB605/11	SB605/38	SB705/38	DV105/05	DV605/05	20DV7/39	25DV7/39	45DV7/39	65DV7/39	MV1971
6	6	6	6	6	6	6							✔				6	6		6							
✔		✔		✔			✔	✔		✔	✔		✔	✔			✔	✔									✔
			✔			✔														✔							
	✔				✔																✔	✔					
			✔			✔			✔			✔			✔	✔			✔	✔			✔	✔	✔	✔	
			✔			✔			✔			✔			✔	✔			✔	✔			✔	✔	✔	✔	
							✔	✔	✔	✔	✔	✔	✔	✔	✔	✔					✔		✔	✔	✔		✔
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	✔	✔	✔		✔	✔												✔	✔	✔		✔				✔	
✔	✔	✔	✔	✔	✔	✔							✔			✔	✔	✔	✔	✔						✔	
				✔	✔	✔							✔							✔							
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	✔
	✔				✔																✔	✔					
4	4	4	4	4	4	4	2	2	2	2	2	2	2	4	4	4	4	4	4	4	2	4	2	2	4	4	2
2	2	2	2	2	2	2											2	2	2	2		2				2	
100	100	100	100	100	100	100	260	260	260	260	260	260	100	260	260	100	260	260	260	100	260	260	260	260	260	260	260
100	100	100	100	100	100	100	170	170	170	170	170	170	100	170	170	100	170	170	170	100	170	170	170	170	170	170	170
✔	✔	✔	✔	✔	✔	✔								✔	✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	
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							✔	✔	✔	✔	✔	✔		✔	✔		✔	✔	✔		✔	✔	✔	✔	✔	✔	✔
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✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
							✔	✔	✔	✔	✔	✔	✔								✔		✔	✔			✔
✔	✔	✔	✔	✔	✔	✔								✔	✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
	✔		✔	✔	✔	✔						✔	✔				✔	✔	✔	✔		✔		✔		✔	
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
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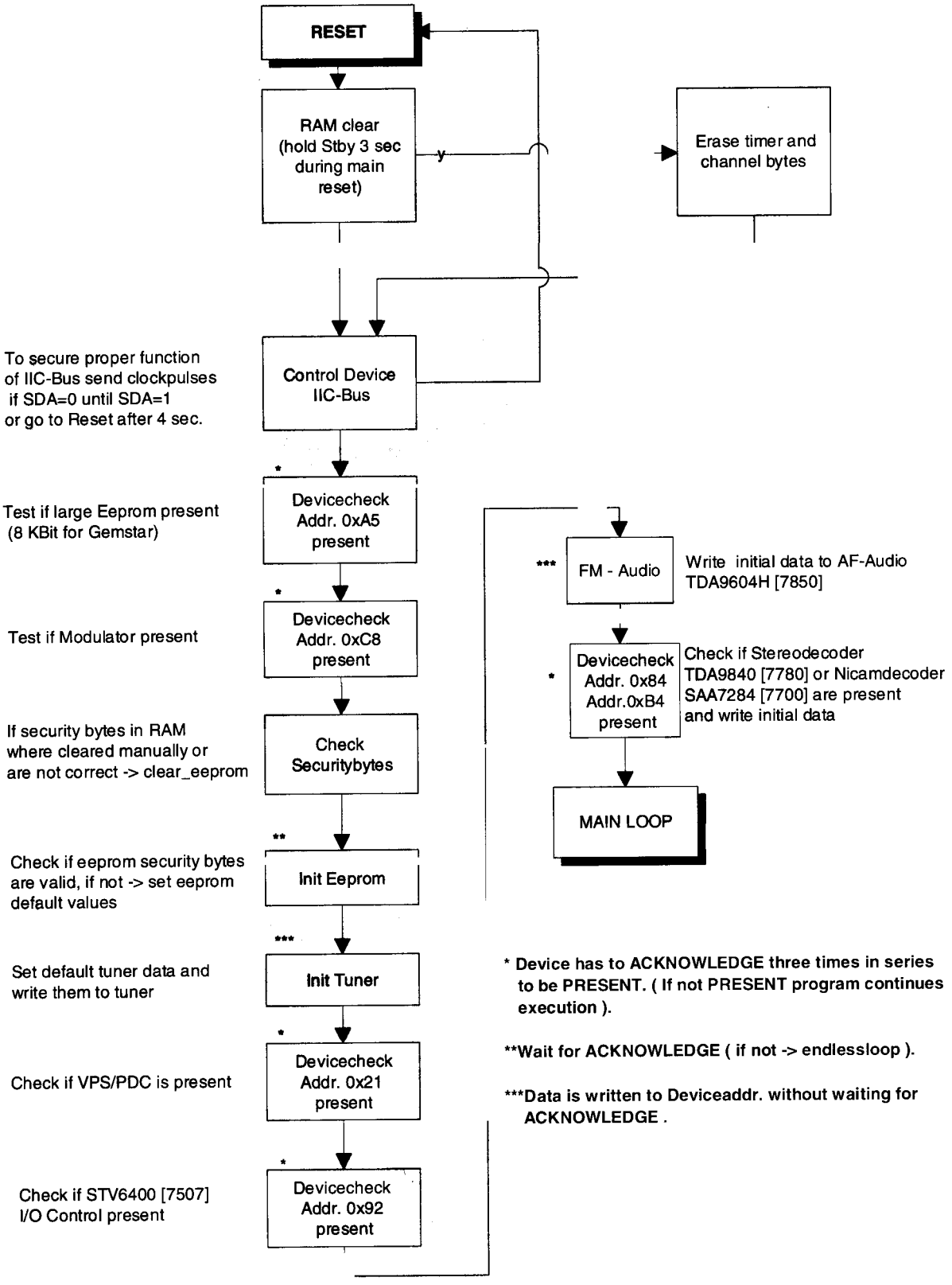
VPDC	PDC	VPDC	VPDC	VPDC	VPDC	VPDC			VPDC	VPDC	VPDC	VPDC	VPS	VPDC	VPDC	VPDC	VPDC	VPDC	VPDC	VPDC	VPDC	PDC	VPDC	VPDC	VPDC	VPDC	
✔	✔	✔	✔	✔	✔	✔			✔			✔	✔		✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔
30mn	30mn	30mn	30mn	7hrs	7hrs	7hrs	30mn	30mn	30mn	30mn	30mn	30mn	30mn	30mn	30mn	7hrs	30mn	30mn	30mn	7hrs	30mn	30mn	30mn	30mn	30mn	30mn	30mn
✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
✔	✔	✔	✔	✔	✔	✔											✔	✔	✔	✔		✔				✔	
✔	✔	✔	✔	✔	✔	✔								✔	✔	✔	✔	✔	✔	✔	✔	✔			✔	✔	
✔	✔	✔	✔	✔	✔	✔				✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	
							✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
✔	✔	✔	✔	✔	✔	✔											✔	✔	✔	✔		✔				✔	
2	2	2	2	2	2	2	1	1	2	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	2	2	2
✔	✔	✔	✔	✔	✔	✔														✔	✔	✔					
				✔	✔	✔																					

Start - up software from the display control - µP


RESET
RAM clear (hold Stby 3 sec during main reset)
y
Erase timer and channel bytes
To secure proper function of IIC-Bus send clockpulses if SDA=0 until SDA=1 or go to Reset after 4 sec.
Control Device IIC-Bus
*
Test if large Eeprom present (8 KBit for Gemstar)
Devicecheck Addr. 0xA5 present
*
Test if Modulator present
Devicecheck Addr. 0xC8 present
If security bytes in RAM where cleared manually or are not correct -> clear_eeprom
Check Securitybytes
**
Check if eeprom security bytes are valid, if not -> set eeprom default values
Init Eeprom
***
Set default tuner data and write them to tuner
Init Tuner
*
Check if VPS/PDC is present
Devicecheck Addr. 0x21 present
*
Check if STV6400 [7507] I/O Control present
Devicecheck Addr. 0x92 present
***
FM - Audio
Write initial data to AF-Audio TDA9604H [7850]
*
Devicecheck Addr. 0x84 Addr.0xB4 present
Check if Stereodecoder TDA9840 [7780] or Nicamdecoder SAA7284 [7700] are present and write initial data
MAIN LOOP
* Device has to ACKNOWLEDGE three times in series to be PRESENT. (If not PRESENT program continues execution).
**Wait for ACKNOWLEDGE (if not -> endlessloop).
***Data is written to Deviceaddr. without waiting for ACKNOWLEDGE .

Survey of sets and PCB`s with software versions

	QMB - MOTHERBOARD																										TAPE DECK					
	-QMB layout	-PS Power supply	-HA Head amplifier	-DE Deck electronics	-DC Display control	-VS Signal electronic	-AL Audio linear	-IO IN/OUT	-VS-SEC Signal electronic	-FV Frontend	-AF Audio FM	-OSD, FOME, VPS Part	**Deck Control-µP Pos. 7400**	**Display Control-µP Pos. 7201**												***-CINCH Board rear***	***-QNIC NICAM Board***	***-QKP21 Shuttle Board***	2 video heads, PAL, SECAM	2 video heads, longplay PAL	4 video heads, PAL	4 video heads, SECAM	4 video, 2 audio heads, PAL	4 video, 2 audio heads, SECAM
Page 3 -	12	14	15	16	17	18	18	19	20	21	22	23	16	17												18	25	26	Chapter 4					
													QTDP2-xU	QDCE1-xP	QDCE2-xU	QDCE3-xU	QDCH1-xP	QDCH2-xU	QDCH3-xU	QDCH4-xU	QDCH5-xU	CINCH rear	QNIC	QKP21	WDQ-P2/0	WDQ-P2/0LP	WDQ-P4/0	WDQ-S4/0	WDQ-P4/2	WDQ-S4/2
VR171/02	✔												✔		✔										✔								
VR171/13	✔												✔		✔										✔								
VR171/16	✔												✔		✔										✔								
VR171/58	✔												✔			✔									✔								
VR175/02	✔												✔												✔								
VR175/05	✔												✔	✔															✔				
VR175/13	✔												✔		✔										✔								
VR175/16	✔												✔		✔										✔								
VR175/39	✔												✔		✔										✔								
VR276/02	✔												✔		✔										✔								
VR276/39	✔												✔		✔										✔								
VR277/02	✔												✔		✔													✔		✔			
VR277/05	✔												✔	✔														✔		✔			
VR475/02	✔												✔		✔																✔		
VR475/16	✔												✔		✔																✔		
VR475/39	✔												✔		✔																✔		
VR475/58	✔												✔			✔															✔		
VR476/39	✔												✔		✔																✔		
VR477/02	✔												✔		✔													✔					
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VR477/58	✔												✔			✔												✔					
VR675/02	✔												✔					✔				✔										✔	
VR675/05	✔												✔									✔	✔										
VR675/16	✔												✔						✔			✔	✔									✔	
VR675/39	✔												✔									✔	✔										✔
VR676/02	✔												✔					✔				✔		✔								✔	
VR676/05	✔												✔				✔					✔	✔	✔								✔	
VR676/39	✔												✔					✔				✔	✔	✔									✔
SB100/03	✔												✔												✔								
SB100/11	✔												✔		✔										✔								
SB100/38	✔												✔												✔								
SB105/03	✔												✔		✔										✔								
SB105/11	✔												✔												✔								
SB105/38	✔												✔		✔										✔								
SB205/02	✔												✔												✔								
SB405/11	✔												✔		✔														✔				
SB405/38	✔												✔																				
SB505/38	✔												✔		✔																		
SB605/03	✔												✔					✔				✔										✔	
SB605/11	✔												✔					✔				✔	✔									✔	
SB605/38	✔												✔					✔				✔	✔										✔
SB705/38	✔												✔					✔				✔	✔										✔
DV105/05	✔												✔	✔																			
DV605/05	✔												✔				✔					✔	✔									✔	
20DV7/39	✔												✔		✔										✔								
25DV7/39	✔												✔		✔										✔								
45DV7/39	✔												✔		✔																		
65DV7/39	✔												✔					✔				✔	✔										✔
MV1971	✔												✔		✔															✔			

(GB)

TECHNICAL DATA

Mains voltage	
Mains frequency	
Power consumption:	
without Low Power Standby	
with Low Power Standby	
Ambient temperature	
Relative humidity	
Dimensions	
Weight	
Fast forward/rewind time (turbo)	
Position of use	
Video resolution	
Audio	

(D)

TECHNISCHE DATEN

. Netzspannung	
. Netzfrequenz	
Leistungsaufnahme:	
Standby	
Standby mit geringem Verbrauch	
Raumtemperatur	
Relative Luftfeuchtigkeit	
Abmessungen	
Gewicht	
Vor-/Rückspulzeit (turbo)	
Betriebslage	
Video-Auflösung	
Audio	

(F)

CARACTERISTIQUES

Tension secteur	220 - 240 V, +/- 10%
Fréquence	45 - 65 Hz
Puissance absorbée	mono 12.5 W during operatio
	HiFi 16 W during operation
mode veille normal	mono 9.5 W
	HiFi 11 W
mode veille faible consommation	< 6 W standby
Température ambiante	+10°C to +35°C
Humidité relative	20 - 80 %
Encombrement	380 x 260 x 94 mm
Poids	3,7 kg
Temps (re-)bobinage (turbo)	typ. 100s (E180 cass.)
Position d'emploi	horizontally, max. 15°
Puissance absorbée	≥240 lines
Audio SP: Linear Audio	80Hz - 10kHz (≤8dB)
Audio LP: Linear Audio	80Hz - 5kHz (≤8dB)
Stereo FM Audio	20Hz - 20kHz (≤3dB)

(NL)

TECHNISCHE GEGEVENS

Netspanning	
Netfrequentie	
Opgenomen vermogen:	
zonder Low Power Standby	
met Low Power Standby .	
Omgevingstemperatuur	
Relatieve vochtigheid	
Afmetingen	
Gewicht	
Vooruit/terugspoeltijd (turbo)	
Gebruikspositie	
Opplossend vermogen	
Audio	

(E)

DATOS TECNICOS

Tensión de red	
Frecuencia de red	
Consumo de potencia:	
sin standby de bajo consumo	
con standby de bajo consumo .	
Temperatura ambiente	
Humedad relativa	
Dimensiones	
Peso	
tiempo de (re-)bobinado (turbo)	
Posición de uso	
Resolución video	
Audio	

(I)

DATI TECNICI

Tensione di alimentazione	220 - 240 V
Frequenza di rete	45 - 65 Hz
Potenza assorbita:	mono 12.5 W during operation
	HiFi 16 W during operation
in attesa non a basso consumo	mono 9.5 W during standby
	HiFi 11 W during standby
in attesa a basso consumo	< 6 W standby
Temperatura ambiente	+10°C to +35°C
Umiditá relativa	20 - 80 %
Dimensioni	380 x 260 x 94 mm
Peso	3,7 kg
Tempo di (ri-)avvolgimento (turbo)	typ. 100s (E180 cass.)
Posizione di funzionamento	horizontally, max. 15°
Risoluzione video	≥240 lines
Audio SP: Linear Audio	80Hz - 10kHz (≤8dB)
Audio LP: Linear Audio	80Hz - 5kHz (≤8dB)
Stereo FM Audio	20Hz - 20kHz (≤3dB)

Euroconnector (AV1) SCART plug 1

Connection to TV, monitor, projection TV ...

Pin 1	ARO (audio right out)	500 mV_{rms} +/- 3 dB	R_{out} 1 kOhm
Pin 2	ARI (audio right in)	0,2 V_{rms} to 2V_{rms}	R_{in} 10 kOhm
Pin 3	ALO (audio left out)	500 mV_{rms} +/- 3 dB	R_{out} 1 kOhm
Pin 6	ALI (audio left in)	0,2 V_{rms} to 2 V_{rms}	R_{in} 10 kOhm
Pin 7	Blue (out) **)		
Pin 8	Switching output:	(with R_{load} = 10kOhm, C_{load} < 2nF) low: 2 V high: 9.5 V rise time: 5 ms	
Pin 11	Green (out) **)		
Pin 15	Red (out) **)		
Pin 16	Blanking (out) **)	loop through enabled during standby, view-mode	
Pin 19	CVBS II (video out)	1 V_{pp} +1/-2dB	R_{out} 75 Ohm
Pin 20	CVBS I (video in)	1 V_{pp} +3/-3dB	R_{in} 75 Ohm

**) passive loop through from AV2

Euroconnector (AV2) SCART plug 2

Connection to decoder, SAT tuner, video disc, 2nd VCR

Pin 1	ARO (audio right out)	500 mV_{rms} +/- 3 dB	R_{out} 1 kOhm
Pin 2	ARI (audio right in)	0,2 V_{rms} to 2 V_{rms}	R_{in} 10 kOhm
Pin 3	ALO (audio left out)	500 mV_{rms} +/- 3 dB	R_{out} 1 kOhm
Pin 6	ALI (audio left in)	0,2 V_{rms} to 2 V_{rms}	R_{in} 10 kOhm
Pin 7	Blue (in) *)		
Pin 8	Switching input only	low: 2 V (low)	R_{in} 10 kOhm
		high: 4.5 V (high)	R_{in} 10 kOhm
Pin 11	Green (in) *)		
Pin 15	Red (in) *)		
Pin 16	Blanking (in) *)	loop through enabled during standby, view-mode	
Pin 19	CVBS II (video out)	1 V_{pp} +1/- 2dB	R_{out} 75 Ohm
Pin 20	CVBS I (video in)	1 V_{pp} +3/-3 dB	R_{in} 75 Ohm

*) passive loop through to Euroconnector AV1

Cinch Audio/Video input on front panel (OPTION)

Audio:

AINFR (audio right in) red	0.2 V_{rms} to 2 V_{rms}	typ. 500 mV_{rms}
AINFL (audio left in) white	0.2 V_{rms} to 2 V_{rms}	typ. 500 mV_{rms}
Input impedance	47 kOhm	

Video:

VFR yellow	1 V_{pp} + 3 / -3 dB
Input impedance	75 Ohm

Cinch Audio Out Rear (OPTION)

AOUT1R (audio right out) red	500 mV_{rms} +/- 3 dB R_{out} 1 kOhm
AOUT1L (audio left out) white	500 mV_{rms} +/- 3 dB R_{out} 1 kOhm

This outputs are in parallel with the corresponding outputs on Euroconnector 1.

TUMOD

Modulator:

Frequency range loop through		45 MHz - 860 MHz
Gain:	ANT IN - TV OUT	2 dB + 3 / -2 dB
	ANT IN - TUN OUT	2 dB + 3 / -2 dB
Switch for RF input attenuation		NO
Frequency range out (tuned by IIC bus)		Ch 21 - Ch55

Tuner:

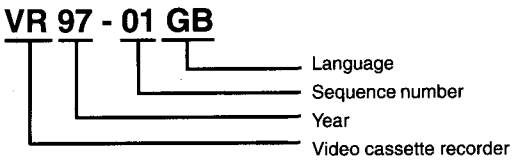
Frequency range		43 MHz - 860 MHz
	for UK	450 MHz - 860MHz
Input voltage max.		< 100 dBµV
min.		> 60 dBµV

Modifications

Description of the system used for publishing modification data and supplements to the service manual.

All modification data and supplements to the Service Manual are published by means of Service Information bulletins.

Each Service information has a number, for example



A Service Information bulletin concists of a front sheet, as the case may be followed by supplementary and/or replacement sheets.

Replacement sheets serve to replace existing sheets in the Service Manual. These sheets are identified by an additional letter after the page number, for example 5-1a. Page 5-1a then takes the place of page 5-1.

Supplementary sheets are inserted between the existing sheets in the Service Manual. These sheets can be identified by an additional figure following the page number, for example 5-1-1.

Sheet 5-1-1 should be inserted after page 5-1

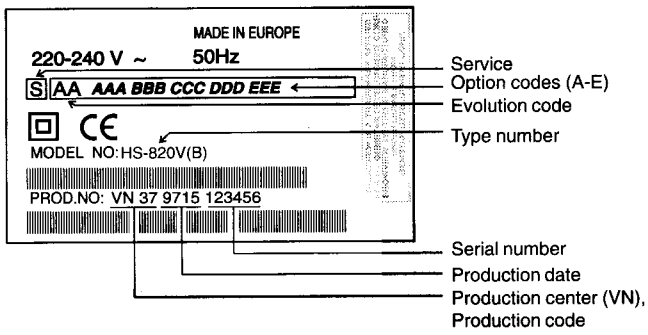
Description of the system by means of which modifications are indicated in the recorder.

All important parts of the recorder, such as tape deck, p.c. boards and modules, are provided with a sticker. These stickers specify a number of product data. The meaning of this data will now be explained for the most important sections.

The complete recorder

The type plate is located at the back of the recorder, below an example of such a type plate is given.

Type plate

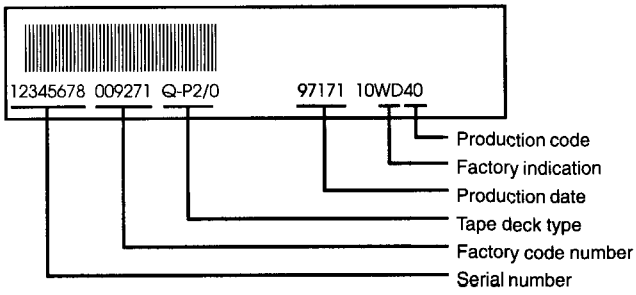


Note

In the case of an important modification to the recorder the production code on the type plate is increased by one.
E.g. 37 becomes 38.

In the case of an important modification to the service documentation the evolution code on the type plate is increased by one.
E.g. AA becomes AB.

Tape deck



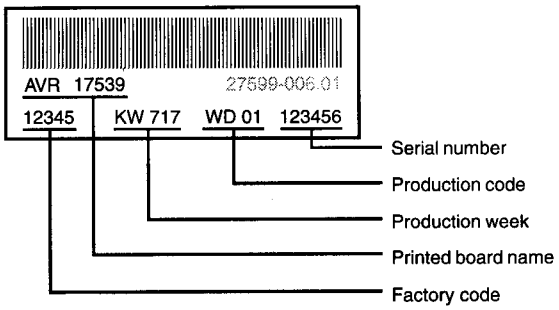
Note :

The production code and the serial number on the tape deck need not correspond to the production code and the serial number on the type plate.

Printed panels

The stickers are generally located on the track side of the module.

Example



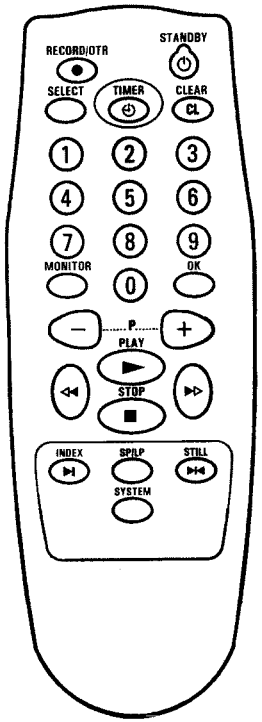
Remarks :

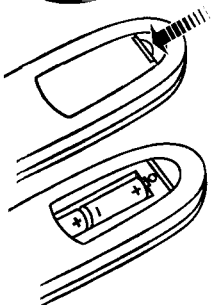
The production code number will not always be mentioned.

In case of an important modification, the last figure of the factory code number (point number) is increased by one. E.g. 6635.1 becomes 6635.2.

OPERATING INSTRUCTIONS IN BRIEF

The remote control





RECORD/OTR ● Record

STANDBY ⏻ Standby

SELECT Function selector

TIMER ⏲ 'SHOWVIEW' or 'TIMER' programming

CLEAR (CL) Reset, clear

0-9 Digit buttons 0-9

MONITOR TV monitor function

OK Confirm button

P− Down/Minus, programme number

P+ Up/Plus, programme number

PLAY ► Playback

◄◄ Rewind/Reverse scanning

►► Forward wind/ Forward scanning

STOP ■ Pause/Stop, Tuner-mode

INDEX ►| Index search

SP/LP (SP/LP) selection

STILL ►◄ Still picture

SYSTEM TV system selection

Front of the set

STANDBY ⏻ Standby switch

− Down/Minus, programme number

+ Up/Plus, programme number

RECORD ◉ Record

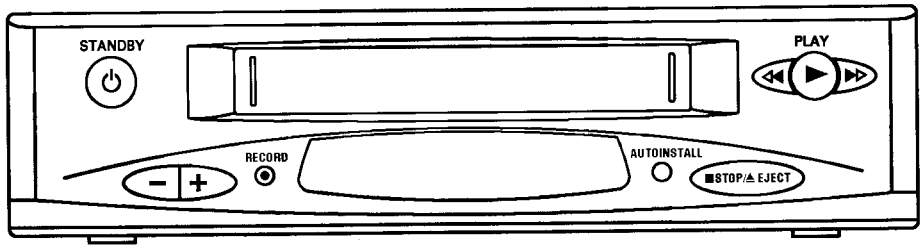
AUTOINSTALL Installation

■STOP/▲ EJECT Stop/Cassette eject

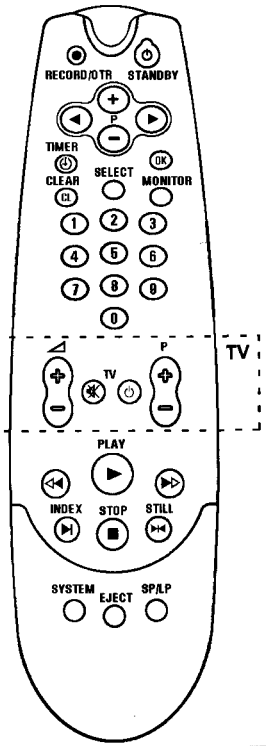
◄◄ Rewind/Reverse scanning

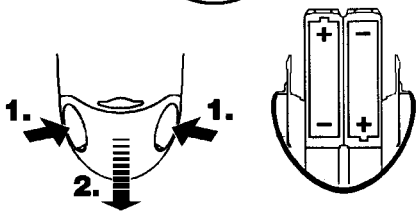
PLAY ► Playback

►► Forward wind/ Forward scanning



The remote control





RECORD/OTR● Record

STANDBY⏻ Standby

◀ Menu left

P+ Up/Plus, programme number

P− Down/Minus, programme number

▶ Menu right

TIMER⏲ 'TIMER' programming

OK Confirm button

CLEAR (CL) Reset, clear

SELECT No function

MONITOR TV monitor function

0-9 Digit buttons 0-9

◀◀ Rewind/Reverse scanning

PLAY▶ Playback

▶▶ Forward wind/ Forward scanning

INDEX▶| Index search

STOP■ Pause/Stop, Tuner-mode

STILL▶|◀ Still picture

SYSTEM Special function

EJECT Eject

SP/LP No function

Additional TV functions: Only function with televisions with the **same** remote control code.

TV ◿ +/− TV volume

TV 🔇 TV sound off

TV⏻ Switch off TV

TV/P +/− Programme number +/-

Front of the set

RECORD● Record

PROGRAMME− Down/Minus, programme number

PROGRAMME+ Up/Plus, programme number

STANDBY⏻ Standby

EJECT⏏ Cassette eject

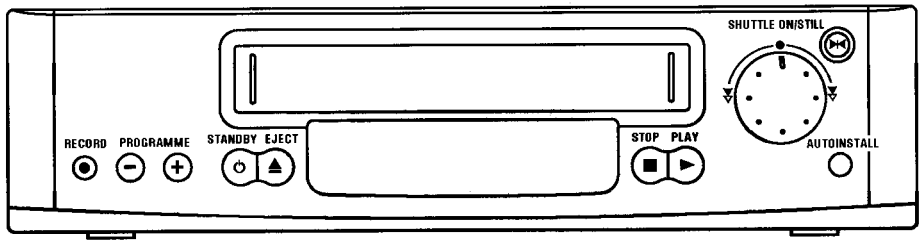
STOP■ Pause/Stop

PLAY▶ Playback

SHUTTLE ON/STILL▶|◀ Still picture

-⊙+ Rotary control for Rewind/Reverse scanning or Forward wind/ Forward scanning

AUTOINSTALL Installation button



Saving energy

You can choose between two methods of switching to standby.
1. Normal method - switch to standby using the STANDBY button. The clock time remains displayed. If the clock has not been set, '--:--' appears in the display.
2. To save energy - Press the STANDBY button twice. The clock time disappears from the display.

Emergency interrupt

Both the set and the remote control have an 'Emergency interrupt' button. You can use the STANDBY button to interrupt any function.
Whenever you have operating problems you can simply interrupt the function and start again.
You can practise operating your set without any worries. No matter which buttons you press, you cannot damage it.

Automatic Channel Search

1. Press the AUTOINSTALL button on the video recorder.
2. Select the required OSD language.
   The video recorder display always shows English text.
3. Confirm with the OK button.
4. The automatic channel search starts.
5. Wait until all the TV channels have been found. This may take several minutes.
6. Adjust 'TIME', 'YEAR', 'MONTH', 'DATE' if required.
7. Confirm each entry with the OK button.

How to search for a TV channel manually, you read in chapter 4 'SPECIAL FEATURES', 'Manual channel search'.

Note: If TV channels have been stored already, select and confirm the 'AUTOSEARCH' line after step 1. The following procedure will be reduced to steps 4 and 5.

Autoinstall (only for UK)

The video recorder will search for all TV programmes. It stores TV programmes found in the following sequence: BBC 1, BBC 2, ITV, CH 4, CH 5, SKY, others.

Setting the clock

Time/Date Download:
If a television programme which transmits TXT/PDC is stored with programme number 'P 01', time (from TXT) and date (from PDC) will automatically be taken from the TXT/PDC information.

Synchro Time:
If a television programme which transmits TXT (videotext/teletext/top/flof/fastext/supertext and so forth) is stored with programme number 'P 01', the correct time will automatically be taken from the TXT information.

1. Press the AUTOINSTALL button on the videorecorder.
2. Confirm the line 'CLOCK'.
3. Adjust 'TIME', 'YEAR', 'MONTH', 'DATE' if required.
4. Confirm each entry.

Automatic Channel Allocation FOLLOW TV

With this function the video recorder maintains the same programme sequence as on the TV set. This only functions if the video recorder (socket EXT.1) and the TV set are **connected via a scart cable**.

1. Switch on the TV set.
2. Press the AUTOINSTALL button on your video recorder.
3. Select and confirm 'FOLLOW TV'.
   If the video recorder recognizes that the TV set has been connected via a scart cable, 'TV01' appears in the display.
4. Select programme number '1' **on the TV set**.
5. Confirm using the video recorder-remote control. The video recorder compares the TV channels on the TV set and the video recorder.
   If the video recorder found the same TV channel as the TV set, then it stores it at 'P 01'.
6. Wait until e.g.: 'TV02' appears in the display.
7. Select, **on the TV set**, the next programme number, e.g.: '2'.
8. Confirm with the video recoder-remote control.
9. Repeat steps 6 to 8 until all TV channels have been allocated.
   To finish, press the STANDBY button.

Note: If, at step 3 'NOTV' (no signal from TV set) appears in the display, the TV channels can not be allocated automatically. Then read further in chapter 4, section 'Manual channel number allocation'.
* If you allocated the wrong TV-channel at step 5 or 8 you can go back one step with the CLEAR (CL) button.

PLAYBACK

Instant View

If, during wind/rewind, you want to have a quick access to picture scanning, use the 'Instant View' function. If you hold the ◀◀ (Rewind) or ▶▶ (Wind) button during wind or rewind, you will switch to picture scanning. If you release the buttons, the video recorder will automatically switch back to rewind or wind again.

Notes: Some functions switch off automatically after a while (e.g.: Pause, Still Picture, Scanning). This helps to protect the cassette and prevent unnecessary power consumption.
* The picture quality will deteriorate during Picture Scanning. The sound is turned off.
* With this set you can play back cassettes that have been recorded on other video recorders in the NTSC standard. This only works for television sets which are suitable for a picture frequency of 60 Hz.
During NTSC-play back some special features (e.g. still picture) are not possible.

Still picture (2 Video Heads)

1. Press the STILL button. You see a still picture. Interference stripes will appear on the screen.
2. Each time you press STILL again, the picture will move on one step.

Still picture/Slow motion (4 Video Heads)

1. Press the STILL button. A still picture appears on the screen.
2. Each time you press STILL again the picture will move on one step.
3. Hold the STILL button. The picture will be played in super-slow motion.
4. Press the ▶▶ button several times. You have a choice of several playback speeds. When you press the ◀◀ button several times you will return to the still picture. There is no sound during slow motion playback.

Note: If the still picture vibrates vertically, hold the P− or the P+ button at step 1 until the vibration is minimal. This setting will be stored automatically. Please note, however, that interference may still occur with poor quality cassettes.

Tape position/Index search

Tape position: The elapsed playback time, given to the hour and minute, appears in the display.

Relative Linear Counter:
If you want to set the indicator to '0:00' , press the CLEAR (CL) button.
When you insert a cassette, the indicator is automatically set to '0:00' .

Absolute Linear Counter:
When you load a cassette, the video recorder must first calculate the playing time. Therefore, '-:--' appears first and only after the tape has been running for a few seconds the playing time will be shown.
The playback time displayed can be incorrect when using camcorder cassettes or with cassettes made for NTSC-VHS equipment.

Index search: At the beginning of each recording, the video recorder marks the tape with a code mark. You can search for these code marks on the tape. Once the video recorder finds the code mark or a blank space it will automatically switch to playback.

1. Press the INDEX button and then press the ▶▶ button to select the next code mark or the ◀◀ button for the previous code mark.

Note: You cannot use the function 'Index search' with recordings made on another video recorder that does not have this code mark function.

Eliminating picture interference/ Cleaning function

1. During playback, hold the P+ button until 'TRAC' (tracking) appears in the display.
2. Hold the P+ or P− button until the playback quality is at its best.
3. Wait a few seconds, until 'TRAC' disappears from the display. This setting will remain until you remove the cassette.
4. If horizontal lines still appear on the screen, use the Cleaning function:

Cleaning function: During playback, hold the PLAY ▶ 'HEAD' (video head cleaning) appears in the display. The video heads are being cleaned. The video recorder automatically switches back to playback.

Note: Some hired cassettes may have a poor picture/sound quality. This is not a fault in your set.

Note: During picture scanning, still picture and slow motion colour playback may be poor.
* You will obtain the best picture quality when recording at standard speed ('SP').

RECORDING

OTR - recording:
If you do not want to record to the end of the cassette, press the RECORD ● button again. The display shows at what time the recording will stop. With each subsequent press of the RECORD ● button you can add 30 minutes to this time.
You can return to the normal recording status by pressing the CLEAR (CL) button. During playback, search for the correct position on the tape and then press the ■STOP/⏏EJECT button. ⏸ will appear in the display. Now you can start recording as usual by pressing the RECORD ● button.

Display:
During Stop ■ or Pause ⏸ you can switch between the display for TV-channel name and tape position, using the OK button.

Direct Record

Do you want to record a television transmission which you are just viewing?
Press the RECORD ● button with the video recorder **switched to standby**. The video recorder takes the current channel number of the television by means of the scart cable and starts recording.

Note: For 'Direct Record' to function, it must be switched on. To do so, press the AUTOINSTALL button. Select and confirm 'DIRECT RECORD' . Select and confirm 'ON' . After the confirmation the video recorder switches to standby automatically.
* Not all external equipment is suitable for using the 'Direct Record'-function (e.g. some satellite receivers, decoders).
* Don't select another programme number on your television set, until 'OK' appears in the display of your video recorder. This can take up to one minute.

How to programme a recording

The video recorder needs the following information for every programmed recording:

* the date on which the recording is to be made
* the programme number for the TV channel
* the start and stop time of the recording
* 'PDC' or 'VPS' on or off

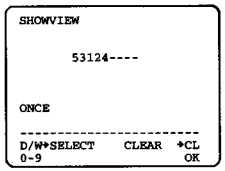
The set stores all the information mentioned above in what is known as a TIMER block. You can programme up to 6 TIMER blocks, one month in advance.

With **'PDC'** (Programme Delivery Control) or **'VPS'** (Video Programming System), the TV station controls the beginning and the length of the programmed recording. This means that the video recorder switches itself on and off at the **right time** even if a TV programme you have programmed begins earlier or finishes later than expected.
Usually the start time is the **same** as the PDC or VPS time. If, however, in the TV guide, in addition to a TV programme's start time, a different PDC or VPS time is given, e.g.: '20.15 (PDC or VPS 20.14)', you have to enter '20.14' as the start time **exactly to the minute**.
If you want to enter a time that differs from the PDC or VPS time, you have to switch off 'PDC' or 'VPS'.

Programming with 'SHOWVIEW'

All the information required for a programming is contained encoded in the SHOWVIEW code.

1. Switch on the TV set.
2. Press the TIMER ⏲ button on the remote control.
3. Please enter the SHOWVIEW code (up to 9 digits) printed in your TV guide next to the start time of a TV programme.
   If you make a mistake, clear with the CLEAR (CL) button.



4. If you want to programme at daily or weekly intervals, press the SELECT button until 'D-DAILY' (daily intervals) or 'W-WEEKLY' (weekly intervals) appears on the TV screen. The 'daily intervals' function can only be used for recordings to be made from Mondays to Fridays inclusive.
5. Confirm the entries with the OK button. The resultant data appear on the TV screen.

Note: If you use SHOWVIEW for the first time for this TV channel, the 'SELECT PROG' line appears when you confirm the SHOWVIEW code. Select and confirm the programme number for the TV programme required.
* Switch 'PDC' or 'VPS' (V/P) on or off with the SELECT button.
* If you wish to set a later end time for a recording, press the P+ button at step 5. With each press on the P+ button you add 15 minutes to the time.
* If e.g.: '20:00' appears in the display, please set the clock.

6. Finally, press the OK button. Programming is now complete.
   The data has been stored in a TIMER block.

7 Make sure that a cassette without erase protection has been loaded. Switch to standby with the STANDBY button.
A programmed recording will only function when the video recorder is **switched to standby** with the STANDBY button.

Note:
* SHOWVIEW Aerial-code numbers: With this set, SHOWVIEW aerial-code numbers will be allocated automatically.

Programming recordings manually (SHOWVIEW/VIDEOPlus +)

1 Switch on the TV set. Press the TIMER button **twice**.

Programming recordings manually (without SHOWVIEW/VIDEOPlus +)

1 Switch on the TV set. Press the TIMER button.

2 Select a free TIMER block. Press the TIMER button.

3 With the TIMER button you can select between the entries 'DATE' (date), 'PROG' (programme number), 'START' (start time) and 'END' (stop time).
You can enter or adjust data. Confirm each entry with the TIMER button.
You can switch 'VPS/PDC' (V/P) on and off at step 'START' with the SELECT button.
You can select between 'D' (daily intervals) or 'W' (weekly intervals) at step 'DATE' with the SELECT button.

4 Finally, press the OK button. Programming has now been completed.

5 Make sure that a cassette without erase protection has been loaded. Switch to standby with the STANDBY button.

Note:
* **Clear a TIMER block:** At step 1 select the TIMER block that you want to clear. Press the CLEAR (CL) button.
If e.g.: '20:00' appears in the display, the clock must be set.

Important programming notes

When recordings have been programmed, TIMER appears in the display.
The programmed recording will always be made at the recording speed (SP/LP) that **at the time** has been selected on the video recorder.
You cannot operate the set manually while a programmed recording is being made. If you want to interrupt the programmed recording, press the STANDBY button.
If the video recorder is switched on a few minutes before a programmed recording is due to take place, 'TIMER RECORD' will flash on the TV screen.
If the end of the cassette is reached during a programmed recording, the video recorder automatically ejects the cassette.
If you forget to load a cassette, after programming the recording, 'NO CASSETTE' will appear on the TV screen for a few seconds.
If you insert a cassette with erase protection, after programming the recording, 'PROTECTED CASSETTE' will appear on the TV screen for a few seconds.
The cassette will then be ejected.
When all TIMER blocks have been programmed, 'TIMER FULL' appears on the TV screen at step 1.
If 'CODE ERROR' appears on the TV screen, the SHOWVIEW code was incorrect or the date was incorrectly entered. Repeat the entry or end with the STANDBY button.
With programming at daily intervals, the first recording must take place within a week.
If 'DAILY ERROR' appears on the TV screen, the date was incorrectly entered. Programming at daily intervals can only be used for recordings to be made from Mondays to Fridays inclusive.
Programme number 'E1' is provided for programmed recordings from external sources (via the EXT.1 scart socket).
Programme numbers 'E1' and 'E2' are provided for programmed recordings from external sources (via the EXT.1 or EXT.2 scart socket).

SPECIAL FEATURES

Tuner mode

You can also use your video recorder as a TV receiver (tuner).

1 Hold the STOP button, until [ ] appears in the display.

2 Choose the required programme number with the P− or P+ button or with the 0-9 buttons.

3 Switch the video recorder to standby by pressing the STANDBY button when you no longer want to watch television.

Sound track selection (only HIFI sets)

You can select the sound track. This is of particular interest when the audio transmissions are multilingual.

1 Press the SELECT button. The current setting will appear in the display. By pressing the SELECT button several times you can select from the four possibilities displayed ('STEREO' ,'RIGHT' ,'LEFT' ,'MONO').

Note: During playback you can select a fifth possibility: the 'MIXED' mode. In this mode you can play back the mono sound of the normal (linear) audio track together with the sound of the stereo audio track. This can be used for playing back a recording dubbed on another video recorder.
* If there is no stereo sound recorded on the cassette, the video recorder automatically switches over to mono sound.

Changing the TV system

If you play back recordings made on other video recorders or if you record from an external source, the automatic TV system switch-over may not always work properly.

1 **Before** recording, or **during** playback, select the TV system with the SYSTEM button.

2 If you select a different programme number, or eject the cassette, the video recorder switches back to 'automatic'.

Externally controlled TIMER recording

Do you have another device, e.g. a satellite receiver, which can control other equipment by a Programming function? This video recorder can be remote-controlled via socket EXT.2 , by means of a scart cable.

1 Insert a cassette. Switch to standby with the STANDBY button.

2 Hold the MONITOR button until 'REC.P' appears in the display.

3 If you want to interrupt this function **before** the recording has actually started, hold the MONITOR button until the video recorder switches to standby.

4 If you want to interrupt this function **while** a recording is being made, press the STANDBY button.

Child lock (RT174)

1 With the video recorder switched on, press the STANDBY button on the remote control **for a few seconds** until appears in the video recorder display. Keep the remote control in a safe place.

2 When you want to switch off the child lock, press the STANDBY button again **for a few seconds** until disappears from the video recorder display.

Note: If a button is pressed with activated child lock, appears in the display for a few seconds.
* Programmed recordings are made despite the child lock and cannot be interrupted.

Child lock (RT170)

1. With the video recorder switched on, press the STANDBY ⏻ and the SELECT button on the remote control **for a few seconds** until σ appears in the video recorder display.
   Keep the remote control in a safe place.

2. When you want to switch off the child lock, press the STANDBY ⏻ and the SELECT button again **simultaniously, for a few seconds** until σ appears in the video recorder display.

Note: If a button is pressed with activated child lock, σ appears for a few seconds in the display.
* Programmed recordings are made despite the child lock and cannot be interrupted.

On Screen Display (OSD)

You can switch the On Screen Display (OSD) on or off.

1. Press the AUTOINSTALL button on the video recorder.
2. Select and confirm 'OSD'.
3. Select and confirm 'ON' or 'OFF'.

Note: With the OK button you can superimpose the actual operating mode on the TV screen.

Channel number or frequency display

You can switch between the display for 'channel number' or 'frequency' for manual channel search.

1. Press the AUTOINSTALL button.
2. Select and confirm 'CHANNEL/FREQUENCY'.
3. Select and confirm 'CHANNEL' or 'FREQUENCY'.

Manual channel search

In certain cases the Automatic Channel Search may not be able to find all of the TV channels (e.g. coded TV channels). You can then use this manual method to set the channels.

1. Press the AUTOINSTALL button on the video recorder.
2. Select and confirm 'MANUAL SEARCH'.
3. Hold the P+ button until you have found the right TV channel. A changing channel number or frequency will appear on the TV screen.
4. Confirm with the OK button.
5. Select and confirm the programme number that you wish to allocate to this TV channel (e.g.: 'P 01').
6. If you want to allocate more TV channels, repeat steps 3 to 5 until all TV channels have been stored.
7. To end, press the STANDBY ⏻ button.

Note: Channel number or frequency can also be entered directly at step 3, using the 0-9 buttons.
* To enter a special/hyperband channel, first enter the channel digit '9'. The indication changes from 'CH' to 'CA'. For example, for special channel 'S 30', enter '9 30'.
* **Allocating a decoder:** If you want to allocate a decoder, press the INDEX ⏭ button at step 3 until 'DEC' appears in the display.
* This video recorder can receive HI-FI sound transmissions in 'NICAM'. At step 3, you can switch 'NICAM' off or on with the SELECT button.
* If the picture or sound quality is poor, you might have selected the wrong TV system. Press the SYSTEM button at step 3 to change the TV system.

Manual Channel Number Allocation

You can allocate any desired programme number to the TV channels stored by the 'Automatic Channel Search'.

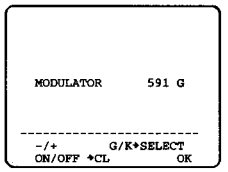
1. Press the AUTOINSTALL button.
2. Select and confirm 'CHANNEL ALLOCATION'.
3. Use the P− or P+ button, to select the TV channel on the TV screen, to which you wish to allocate a programme number (starting with 'P 01').
4. Confirm this allocation.
   If you wish to allocate further programme numbers, repeat step 3 and step 4 until you allocated a programme number to all the required TV channels.
5. To end press the STANDBY ⏻ button.

Note: If you want to delete an **unwanted** TV channel, press the CLEAR (CL) button at step 3.
* **Monitor function:** You can switch to and fro between TV reception and video recorder reception with the MONITOR button. This only functions when you used a scart cable to connect the video recorder to your TV set and if your TV set responds to this switch-over.

Playback via the aerial cable

If you do not wish to use a scart cable, the **aerial cable which is already connected** will act as the connection between your TV set and the video recorder. Ensure that the video recorder is connected to the mains supply.

1. Switch on your TV set and select the programme number that you have earmarked for video playback. (see operating manual for your TV set).
2. Ensure that **no** cassette has been loaded. With the video recorder **switched to standby**, hold the SYSTEM button for a few seconds until a modulator frequency e.g.: 'G591'(UHF-channel 36) appears in the display. The video recorder transmits a test picture.
3. Tune in the TV set in the UHF wave band until this picture appears.



4. Switch the video recorder to standby with the STANDBY ⏻ button.
   If you have interrupted making standard settings as described in Chapter 1, 'INSTALLATION', turn to that chapter to continue making the standard settings.

Note: This modulator frequency might already be occupied by another TV station in your reception area, e.g. 'Channel 5'. In this case you will find that the picture quality on your TV set will be poor when receiving one or more TV channels.
* **Adjusting the modulator frequency:** If the picture quality only deteriorates when the video recorder is switched on, adjust the modulator frequency. The frequency can be adjusted at step 2 with the P− or the P+ button. Confirm the adjusted frequency with the OK button.
* **Switching off the modulator:** If you **cannot eliminate** picture or sound interference using the above method you can switch off the built-in modulator. You should only do this if you have connected the video recorder to the TV set using a scart cable. 'Playback via the aerial cable' is **not** possible when the modulator is switched off.
At step 2, press the CLEAR (CL) button for several seconds until 'MOFF' (modulator switched off) appears in the display. You can switch back again in the same way.
* **The GK switch:**
If you don't have sound during playback, switch to the other TV system on the video recorder. At step 2, select between e.g.: 'K591' (TV system SECAM-D,K) and e.g.: 'G591' (TV system PAL-B,G) with the SELECT button.

TOOLS FOR ERROR DIAGNOSIS

Replacement procedure for leadless components (chip)

The following procedures are recommended for replacing leadless components used in this unit.

1. Preparation for replacement

a. Soldering iron
Use a pencil-type soldering iron that uses less than 30W.

b. Solder
Use Eutectic solder
(Tin 63%, Lead 37%)

c. Soldering time
Maximum 4 seconds.

Note:
a. Leadless components must not be re-used after removal

b. Excessive mechanical stress and rubbing of the component electrode must be avoided.

2. Removing the leadless components

Grasp the leadless component body with tweezers and alternately apply heat to both electrodes. When the solder on both electrodes has melted, remove leadless component with a twisting motion.

Note:
a. Do not attempt to lift the component off the board until the component is completely disconnected from the board with a twisting motion.

b. Be careful not to break the copper foil on the printed circuit board.

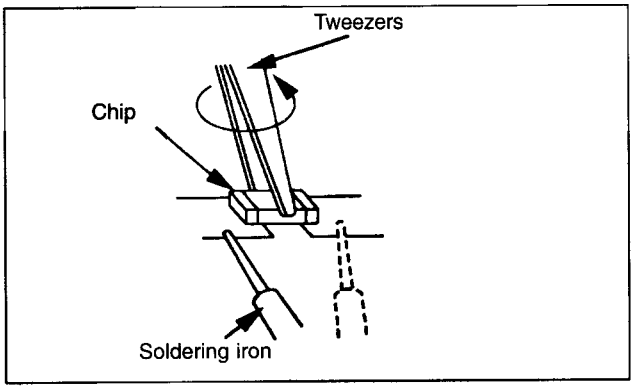


Fig. 2-1

3. Installation of leadless components

a. Presolder the contact points on the circuit board.

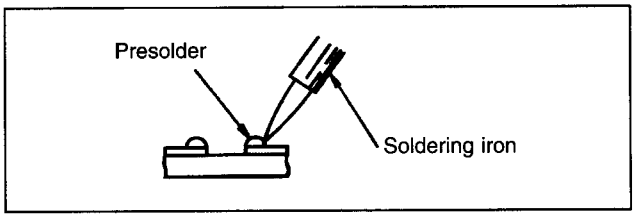


Fig. 2-2

b. Using tweezers press down the part and solder both electrodes as shown below.

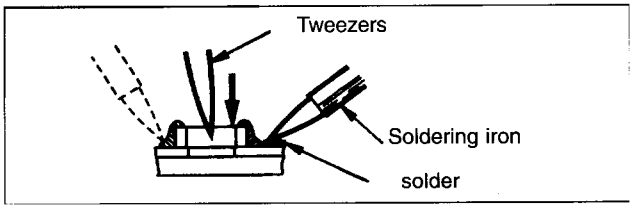


Fig. 2-3

Note:
Do not glue the replacement component to the circuit board.

How to remove/install the FLAT PACK IC

1. How to remove the Flat Pack IC

• Using a hot air Flat Pack IC unsoldering equipment

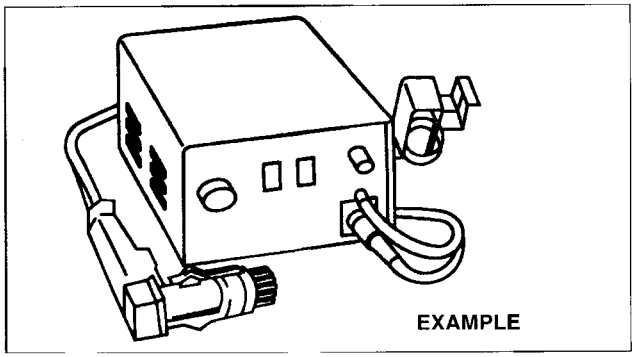


Fig. 2-4

a. Prepare the hot air Flat Pack IC unsoldering equipment. Then apply hot air to Flat Pack IC for 5 - 8 seconds.

b. Remove the Flat Pack IC with tweezers while applying the hot air.

CAUTION:
To avoid damage, do not apply the hot air to the chip parts around the Flat Pack IC for long periods.

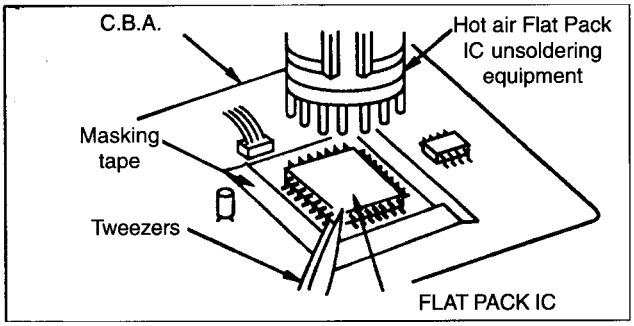


Fig. 2-5

Put masking tape around the Flat Pack IC to protect adjacent parts.

2. The Flat Pack IC is fixed to the P.C.B. with glue; therefore take care not to break or damage any foil under the IC or on each pin when removing it.

• *Using a soldering iron*

a. Use unsoldering braid to remove the solder from all pins of the Flat Pack IC.
Apply solder flux to all pins of the Flat Pack IC, to allow easy removal.

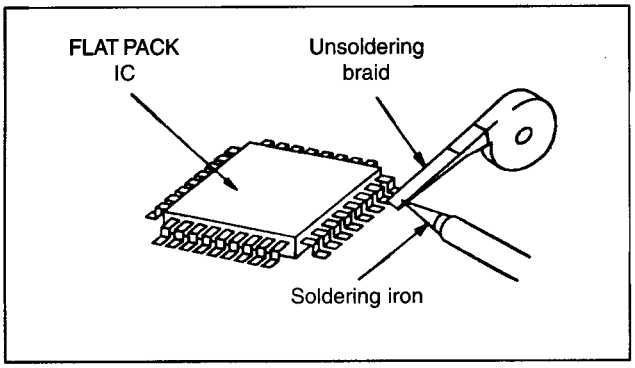


Fig. 2-6

b. Lift up each lead of the Flat Pack IC individually, using a sharp pin or non-solder wire (iron wire), while heating the pins using a fine tip soldering iron or a hot air blower.

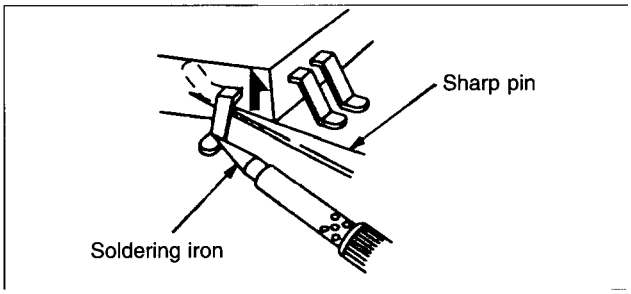


Fig. 2-7

• *Using iron wire*

a. Use unsoldering braid to remove the solder from all pins of the Flat Pack IC. Apply solder flux to all pins of the Flat Pack IC, to allow easy removal.

b. Affix the wire to workbench or solid mounting point (see Fig. 2-8)

c. Pull up the wire as the solder melts in order to lift the IC lead from the P.C.B. contact pad, while heating the pins using a fine-tip soldering iron or hot air blower.

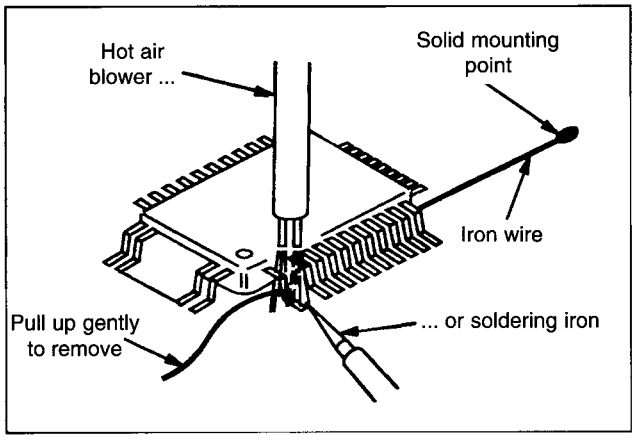


Fig. 2-8

Note:
When using a soldering iron care must be taken to ensure that the Flat Pack IC is not held by glue or the P.C.B. may be damaged if force is used.
If the IC is glued, heat the IC with hot air to loosen the glue.

2. How to install the FLAT PACK IC

a. Use unsoldering braid to remove the solder from the foil of each pin of the Flat Pack IC on the P.C.B. in order to install the replacement Flat Pack IC more easily.

b. The "•" mark on the Flat Pack IC indicates pin 1.
Make sure this mark matches the 1 on the P.C.B. when positioning for installation. Then pre-solder the four corners of the Flat Pack IC. (see Fig. 2-9).

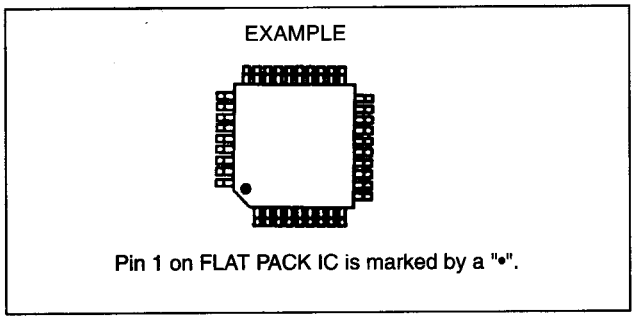


Fig. 2-9

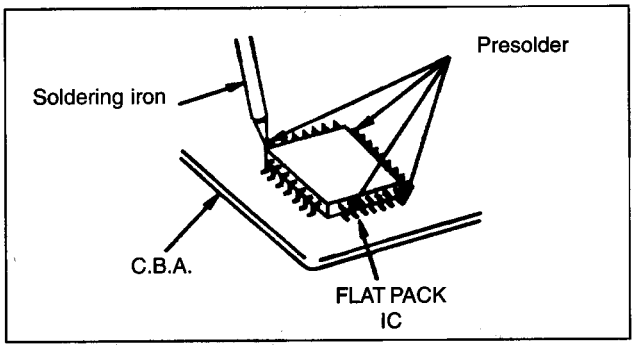


Fig. 2-10

c. Solder all pins of the Flat Pack IC. Make sure that none of the pins have solder bridges between pins on the Flat Pack IC.

Note

All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described in the "SAFETY INSTRUCTIONS" section of this manual.

Voltage measurements

Color bar signal in SP REC and PB modes.

Note:
Voltage indications for the REC. and PB mode on the schematic diagrams are shown below:

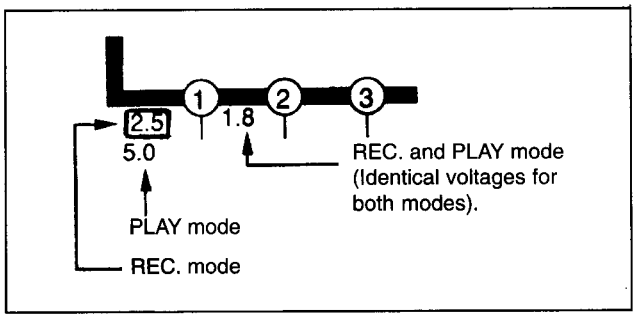


Fig. 2-11

How to read wave forms

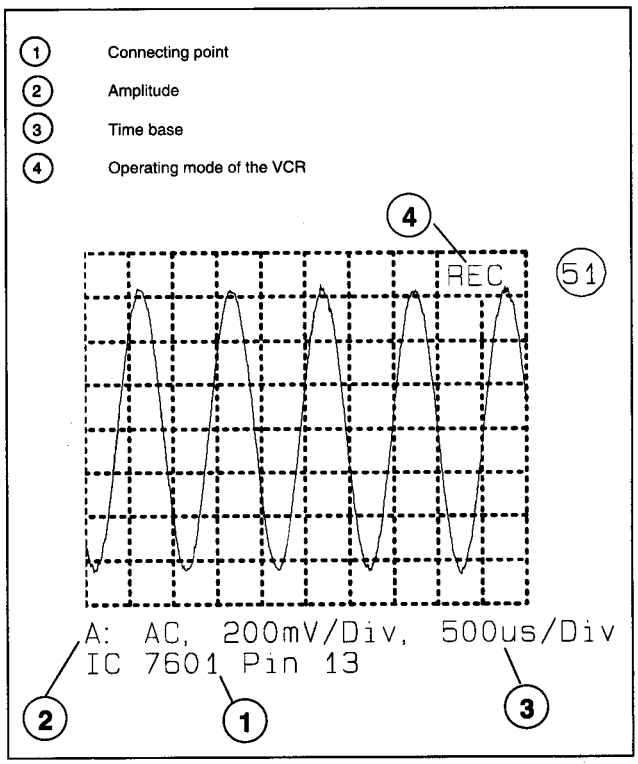


Fig. 2-12

Voltage indication of Zener diodes

The Zener voltage of Zener diodes is indicated as such on schematic diagrams:

Example:
BZX79C**20**. .Zener voltage: 20 Volts

How to identify connectors on schematic diagrams

Each connector is labeled with a connector number and a pin number indicating to what component it is connected; in other words, its counterpart.

Use the Connecting Wiring Diagram to find the connections between associated connectors.

Example:
The connections between C.B.A.s are shown below:

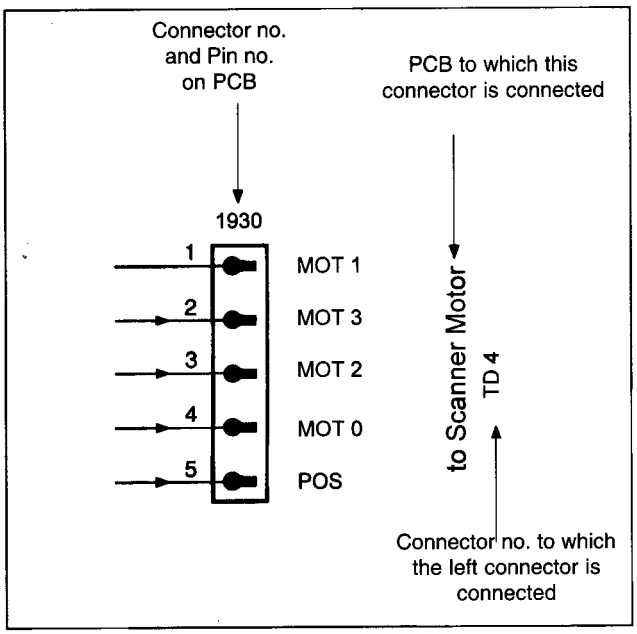


Fig. 2-13

Test point information

With this model, test pin or components leads are used as contact points for adjustment and checking. In case of other test points with no test pin or components leads, use the foil solder pad to connect the measuring equipment.

Removal or installation of flat cables

a. Removal

Pull out the flat cable, holding it securely to avoid damaging individual wires (see fig. 2-14).

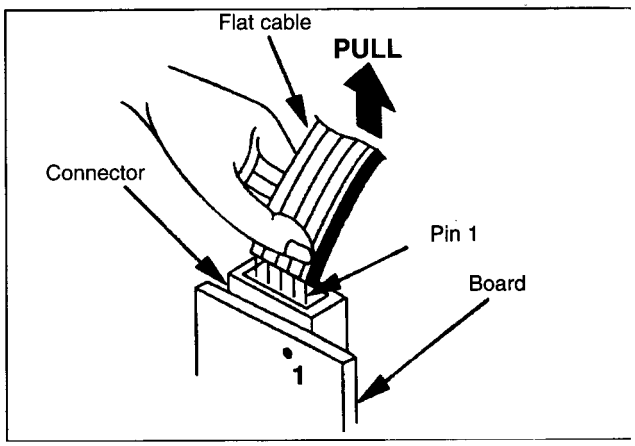


Fig. 2-14

b. Installation

1. Adjust the position of the flat cable so that the lines on the flat cable align with the pins X of the trap connector (see fig. 2-14).

2. Align individual wires with its individual trap connector hole. Then insert the flat cable wire into the trap connector.

   CAUTION: After installation, inspect the connection to insure that individual wires are not bent or touching other wires.

Dismantling instructions

General guidelines for dismantling housing components, electronic parts and the drive mechanism

Always disconnect from mains before dismantling or assembly.

Due to the supply voltages (hot circuit) on the primary side of the switched-mode power supply, an isolating transformer is required for the operation of the device.

The drive or the drive/motherboard unit must not be pulled out by the cross struts!

Components placed below the tape deck has to be inserted exactly.

The use of a regulating isolating transformer is recommended for detecting faults around the power supply.

All screws of the video recorder can be removed or tightened with a 10* torx screwdriver .

1. Housing cover (Fig. 1)

- Remove the four screws (A).
- Push catch (S) inwards, lifting lid at the same time to move out of groove.
- Slide housing cover back by approx. 1 cm.
- Push centre of housing cover sides on underside approx. 1 cm outwards and lift up the housing cover.

Assembly
Assemble in reverse order.

2. Base plate (Fig. 2)

The base plate may not be removed from the frame!

3. Front panel (Fig. 2)

Preparation
Dismantle the housing lid as described in section 1

- Position the device with the base plate facing upwards.
- Undo the six catches (S) one after the other, starting from the left or the right.
- Remove the front panel by pulling it forwards.
- For devices with shuttle print or socket print, disconnect the cabling to the motherboard.

Assembly
Assemble in reverse order (device in operational position).

Important
- The lift flap lever should be connected to the lift flap guide.
- Check that all catches are engaged.

4. Dismantling of the motherboard/drive combination (Fig. 3) (Fig. 4)

Preparation
Remove the housing cover as described in section 1.
Remove the front panel as described in section 3.

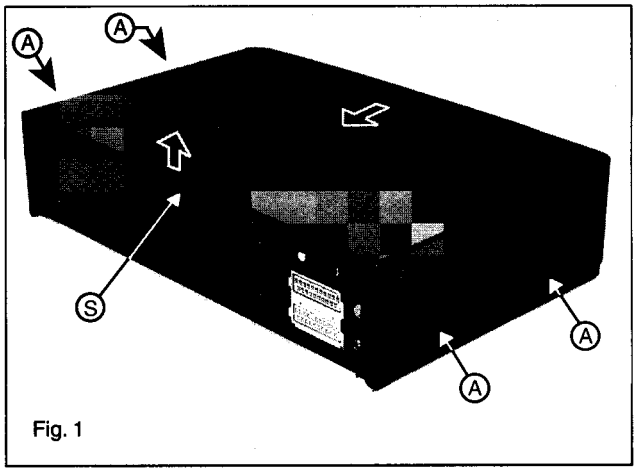


Fig. 1

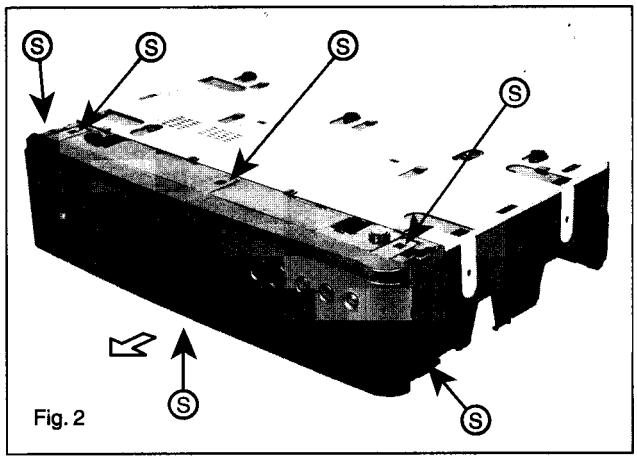
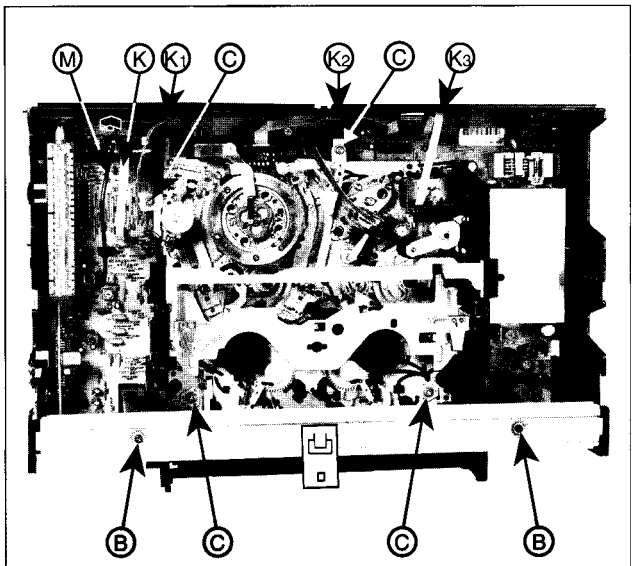


Fig. 2



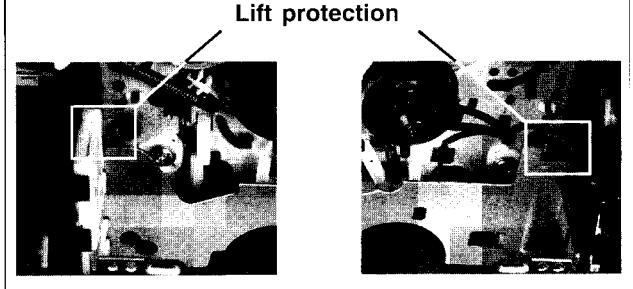


Fig. 3

* ...available from dealers

- Move device into operational position (Fig. 3).
- Undo the two screws (B) of the stay and pull it up to remove it.
- Push back the lift by 5 cm after releasing both lift stops.
- Undo and remove the four fastening screws (C) of the drive.
- Detach the Cinch socket cable (K) and ground cable (M) from the socket print (if present).
- Remove the cables (K1; K2; K3) from the guides on the rear of the frame.
- Pull the Cinch socket holder with the socket and print up and out of the frame (if present).
- Position the device with the base plate facing up.
- Undo the 10 catches (S) from the rear right to the rear front and then from the rear left to the front left.
- After the weight of the motherboard/drive unit has released it from the frame, the catch (S) at the mains socket has to be released for a second time.
- The frame can be removed by lifting it off.
- Turn the motherboard/drive unit and move it into the service position (Fig. 5), if necessary.
  The device is operational in this position
  "Eject" must NOT be used !!!

Caution:
Adjustments can not be made in the service position.
"Eject" must NOT be used !!!

Assembly
- Position the frame with the top open onto a level surface.
- Hold the drive on the side at the lift and insert the motherboard/ drive unit into the frame, pushing it down lightly. Observe that the power supply and Scart sockets are positioned in openings.
- Check that all 10 catches (S) are engaged.
- Secure the drive with the four holding screws (C).
- Move the lift into the "Eject" position.
- Push the stay onto the frame with the chamfered side facing to the rear and secure with both screws (B).
- Insert the Cinch socket into the opening and ensure that it engages.
- Connect the Cinch socket and the ground cable (K ; M) (if present).
- **Insert the cables (K1; K2; K3) into the supports provided in the frame.**
- Replace the front panel and the housing cover.

5. Dismantling the drive (Fig. 3)(Fig. 5)(Fig. 6)

Preparation
Remove the housing cover as described in section 1.
Remove the front panel as described in section 3.

Undo the two screws (B) of the stay and pull it up to remove it.
Push back lift by 5 cm after releasing both lift stops.
Undo and remove the four fastening screws (C) of the drive.
Undo and remove the ground screw (D) at the rear.
(For this purpose, insert the screwdriver through the hole in the back panel).
Remove the cables from the drive.
Bend back the guard of the scanner cable.
Remove the scanner cable from the socket.
Return the lift into the "Eject" position.
Slightly lift the left rear side of the drive to undo the connector to the capstan motor.
Press both catches (S) together with fine pliers and lift the drive around the snapholders.
The drive may be separated from the motherboard.

Assembly
Assemble in reverse order.

Important
Observe that the cables (K1; K2; K3) are positioned in the supports on the rear of the frame and that the ground screw (D) is screwed in!

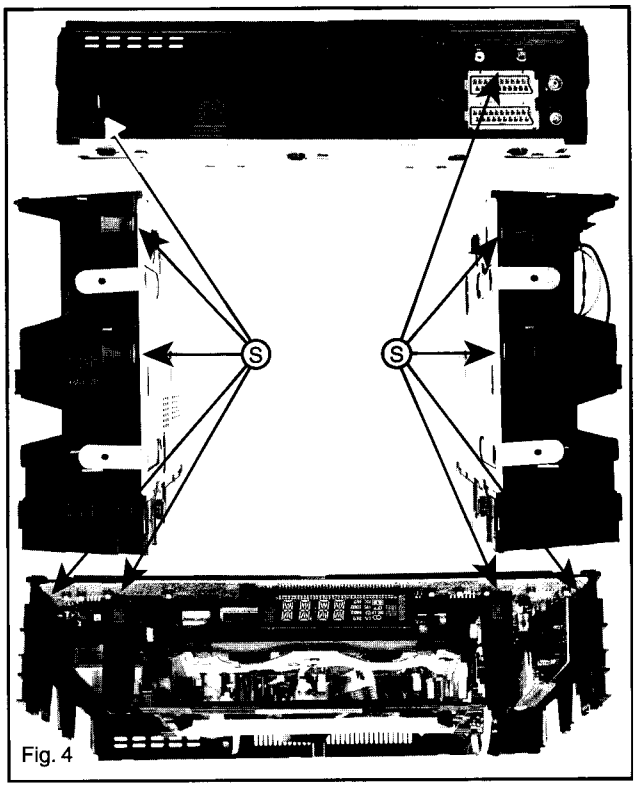


Fig. 4

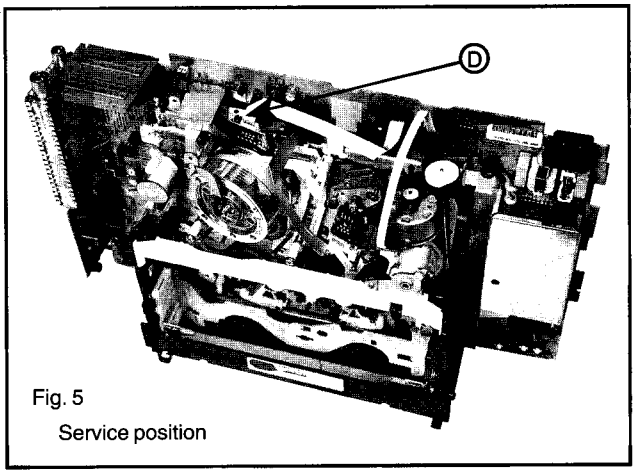


Fig. 5
Service position

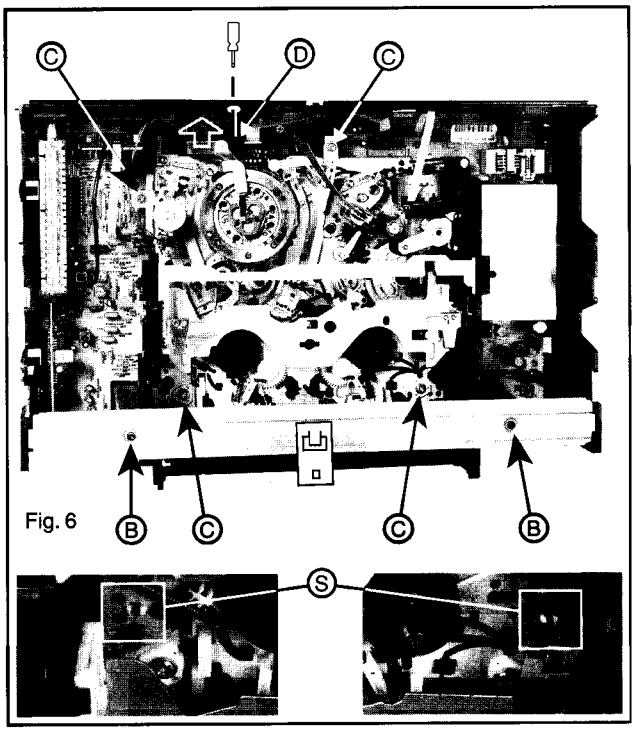


Fig. 6

1. Switched-mode power supply PS (PS - Part)

1.1 Technical data:

Mains voltage:	187-264 Vrms
Maximum output:	40W
Operating frequency:	100 kHz
Efficiency:	approx. 80 % at max. output

1.2 Functional principle (Blocking Oscillator principle):

During the conductive phase of the switching transistor, energy from the mains is transferred to the transformer. This energy is released to the load during the blocking phase. The switch-on time regulates the energy transferred in each cycle in such a way that the output voltages are not affected by load or input voltage changes. The integrated circuit [7354] controls the power transistor.

1.3 Low power stand-by mode:

The 5VASW and the 12SW are switched off with ISTBY and the switched-mode power supply operates with a controlled low frequency of approx. 50 kHz to minimise switching losses.
The power consumption is less than 6 W.

1.4 Reversal point:

At this point of the output characteristic, the maximum power is transferred.

1.5 Overload:

The power supply operates in burst mode. The energy in every cycle is limited, resulting in low output power **(Fig.1)**.

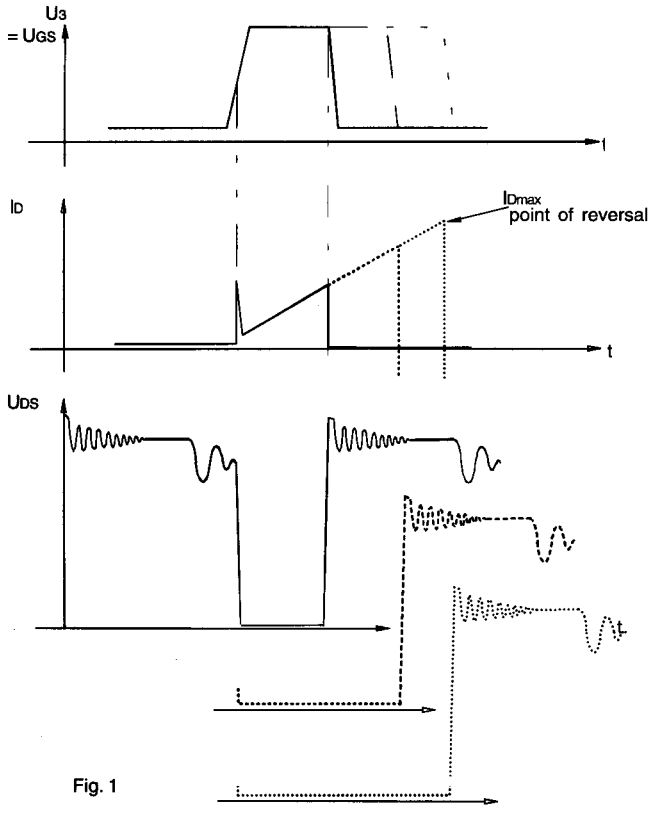


Fig. 1

1.6 Circuit description:

A filter around spool [5352] protects the mains against any interferences generated in the power supply. The mains voltage is rectified by the bridge rectifier [6360] and is filtered by the electrolytic capacitor [2362]. The electrolytic capacitor [2361] charges itself from [3370, 3369] and supplies the IC [7354] during the start-up phase. The supply is then provided by the transformer winding 4-6 with diode [6350]. During the switch-on time of the switching transistor, current from the rectified mains voltage flows through the primary winding of the transformer, the transistor [7350] and the resistor [3363] to earth. As the positive voltage at point 7 of the transformer is constant (for this example), the current increases linearly and forms a ramp, depending on the mains voltage and inductivity of the primary winding. A magnetic field representing a certain volume of energy is formed inside the transformer. The secondary voltages are polarised in such a way that the diodes block. A voltage image of the primary current is passed to pin 7 of the IC [7354] via resistors [3363,3359]. This is checked and, as soon as it reaches a certain value, depending on the control voltage at pin 14 of the IC, the transistor [7350] is switched off.
Once the switching transistor is switched off, no further energy is transmitted to the transformer. The inductivity of the transformer now endeavours to maintain the current that has passed through it at a constant level (U=L*di/dt). The current reduces, however, di/dt becomes negative and the polarity of the voltages at the transformer reverses, resulting in a current which flows through the secondary winding of the transformers, the diodes, the electrolytic capacitors and the load. This current, too, is ramp-shaped (but decreasing).
The switched-mode power supply is controlled by changing the conductive phase of the switching transistor so that either more or less energy from the mains is taken over into the transformer. The control information is provided by the control element [7352]. This element compares the 5V with an internal 2.5V reference voltage. The output voltage of [7352] is passed to pin 14 of IC [7354] via an optocoupler (for galvanic isolation). It compares the voltage to an internal reference value. The resulting value changes the level with which the voltage at pin 7 (image of primary current!) is compared. The voltage at pin 5 of the IC [7354] is used for FOLD BACK in case of overloading. The maximum available secondary power is determined by the resistor [3363]. At a certain voltage (normally 1V) at pin 7 of the IC, the power supply enters the reversal point. The protective circuit at pin 11 is an option of the IC. The start-up phase is carried out with shortened pulses by [2356] so that the operating frequency lies outside the audible range.
On the secondary side, six voltages are available, which are rectified by [6371, 6355, 6356, 6357, 6358, 6359]. The capstan motor voltage 9/14M2 (turbo) is changed over with control line CSW and transistor [7358].

1.7 Description of the start-up phase

After connection to the mains, the following voltages at the pins of IC [7354] **(Fig.2)** rise at time t_0. Vcc (pin 1) corresponding to the half-wave loading via resistors [3369, 3370] to $V_{ccstart}$. In this case, the current input is normally 0.3 mA. The internal reference voltage V_{ref} of the IC is activated upon reaching $V_{ccstart}$ (approx. 13V). The oscillator starts to oscillate. The frequency is determined with the capacitor at pin 10 (approx. 100 kHz), which is charged/discharged via current sources. The current take-up then rises up to 17 mA.

The voltage at pin 11 rises linearly (soft start). The IC starts with shortened pulses until pin 11 has reached a voltage of 2.4V.
If V_{cc} falls below the limit V_{dis2} before the reversal point is reached, or if Vcc rises to V_{ccprot} (normally 16V) (fault in the control loop), the start-up is stopped (pin 3 is switched off) and the IC (U_{ref}) is switched off. V_{cc} increases in accordance with a half-wave loading, a new start-up cycle commences **(Fig. 2).**

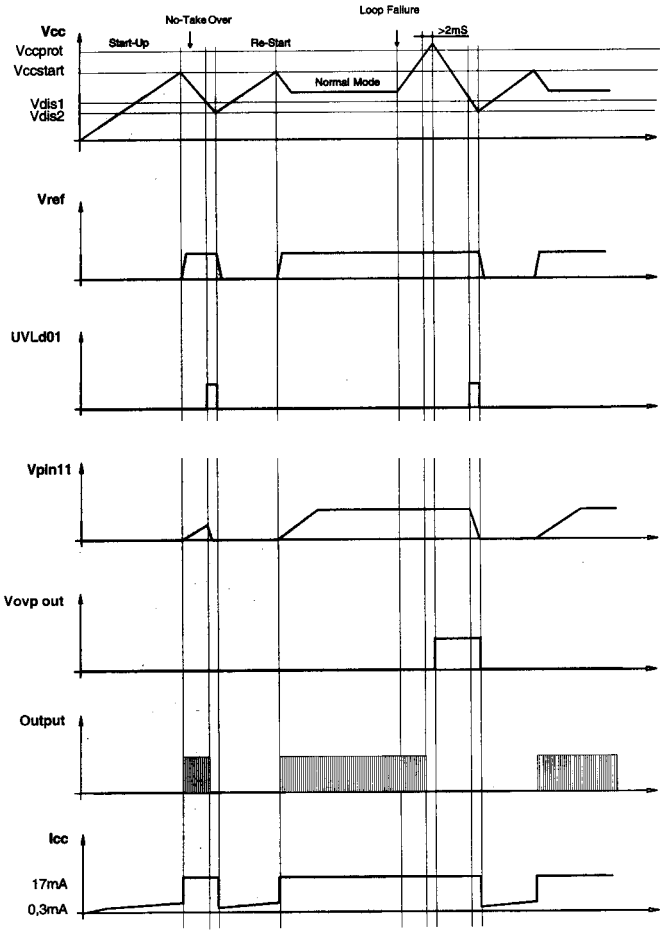


Fig. 2

1.8 Normal operation, overload, standby

After the start-up, IC [7354] is inside the control range. The voltage at pin 14 is normally 2,5V. If the load increases on the secondary side, the switch-on time is increased. The peak voltage value at pin 7 (drain current image) is also increased.
If the load increases further, the overload amplifier of the IC (normally 1V at pin 7) starts to reduce the pulse width of U_3 (reversal point).
The IC supply V_{cc} behaves like the secondary voltages. Consequently, V_{cc} also decreases with increasing load. In the condition $V_{cc} < V_{dis1}$ (approx. 9V), the IC changes to burst mode (query range). The short-circuit capacity is low because the interval between the half-wave start-ups is large.
In case of decreasing load, the switch-on time is shortened. If the load decreases further, the IC switches the frequency back to approx. 50 kHz (standby mode) from a certain voltage threshold at pin 7 (depending on the protective circuits at pins 12,15). This keeps the switching losses at the transistor to a minimum.

1.9 Overheating

The IC [7354] contains overheating protection, blocking the logic in case of excessive chip temperatures (normally 155 °C). Once the temperature has been reduced, a renewed start-up is possible.

2. Deck electronics DE (DE-, DC - part)

2.1 General :

The TVC (Toshiba Video Controller) is a single-chip micro-controller with the following functions:

- 12k byte ROM (242)
- 16k byte ROM (642)
- 320 byte RAM
- 8-bit A/D converter
- 2 serial bus interface
- 2x12-bit PWM outputs
- 1x8-bit PWM output
- Composite sync input
- special aux. inputs

The TVC contains two serial interfaces suitable for data exchange with other µPs. The component is supplied in QFP (64 pin) or SDIP cases (64 pin).
8+4 analogue inputs are available. The resolution of the converter is 8 bit. The max. processable input voltage range is 0...5V (determined by the reference voltages AVSS and AVCC). Three analogue outputs are available, two with 12 bit and one with 8 bit resolution. The outputs supply a signal with a constant frequency (PWM8 approx. 20kHz, PWM1, PWM2 approx. 39kHz) with a variable duty cycle.

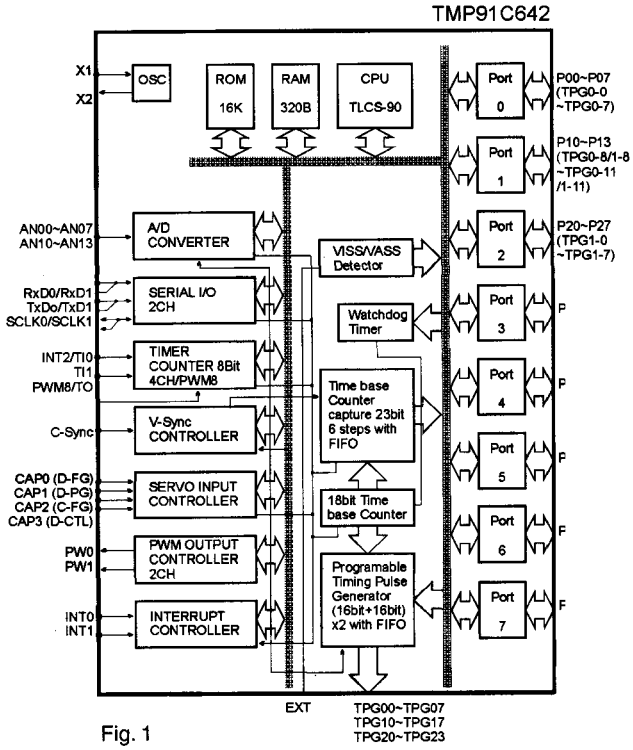


Fig. 1

2.2 SAA 1310 Interface DM - DE :

2.2.1 CTL stage

The IC SAA 1310 contains a read/write- stage for the CTL track with the option of overwriting an existing CTL track without any interference. The playback stage contains a 'digital' two-stage AGC. This switching logic detects the size of the output signal supplied by the CTL head via comparators and then selects the best amplification factor in the playback stage.
The CTL head voltage can therefore vary considerably if V_{max} / V_{min} is >>. The LP mode has the slowest tape speed. The fastest speed is achieved during FAST WIND or FAST SEARCH. To ensure that the duty cycle of the tape sync is always correctly reproduced under the previoulsy-mentioned conditions (important for the detection of VISS markings), the amplifier may not be overdriven.

The two-stage AGC cannot process the large dynamic range of the input voltage on its own. Consequently, the amplifier contains an additional low pass characteristic (normally fg = 3kHz) (internal). Furthermore, the transistor [7469] is used to further reduce the amplification for all WIND modes.
In this case, the signal IWIND is low and T7469 is blocked. The transistor is purposely inversely polarised, as the inverse operation has better attenuation characteristics for this application. If T7469 is blocked, the amplification is mainly determined by the internal negative feedback resistors of the SAA 1310, [7460] and the external resistor pos 3488. By short-circuiting R3488 with T7469, the amplification can be reduced in the following ratio :
Von / Voff = 1 + R3488 / 100.
The RC element comprising capacitor pos 2464 and resistor pos 3489 is connected in parallel to the CTL head. Together with the CTL head inductivity, the capacitor causes an increased resonance at approx. 10 kHz. This is attenuated by R3489 which causes an aperiodic transient response from the resonance. Beyond the resonance frequency, the frequency transfer characteristic shows a steep drop. This achieves an effective suppression of high-frequency interference. The CTL head signal amplitude during SP is approx. 1mVp (normal).
Consequently, the amplification of the playback amplifier must be correspondingly high. To avoid offset problems, a 47 µF electrolytic capacitor [2463] is installed in the negative feedback branch for DC decoupling.
The polarity of the playback amplifier can be switched with the Video - Index - Search - System (VISS) voltage. Only in this way can the TVC write a VISS marking without spikes onto the tape. The signal Write/Read (W/R) is used to switch between recording and playback:
Write : High
Read : Low

2.2.2 POR (Power On Reset) - Generator :

The POR generator contained in the SAA1310 [7460] only requires an external capacitor [2467], which determines the length of the POR pulse.
With a 33 nF, t_{POR} is approx. 30 msec. The response threshold of the reset circuit lies between 4.5 and 4.8 V. Supply fluctuations that are shorter than $t_{POR}/100$ and do not fall below 3.5 V, do not activate a POR.

2.2.3 The sensor interface :

The four comparators in the SAA 1310 [7460] are used for the conversion of sensor signals onto logic levels. Two of these comparators contain open-collector outputs (pin 11 and 13), which can switch a current of 100 mA. The outputs are overload-protected by current limiting and thermal overload protection. Only the non-inverted input of every comparator is externally accessible. The other inputs lie on the internal reference of a nominal 2.5 V. The fixed hysteresis of the comparators of approx. 10 mV is also located internally.

The comparators are connected as follows :

Comparator 1 : In = FTA, pin 5; Out = FTAD, pin 15:
FTA = Threading tachometer. This signal is generated by the butterfly photoelectric barrier in the deck. An infrared beam is interrupted by a 4-section butterfly unit. For a correct evaluation, the output amplitude of the photoelectric barrier must fluctuate at least between the voltage levels 1.5 V and 3.5 V. An additional hysteresis is created with resistor [3492].

Comparator 2 : In = WTR, pin 6; Out = WTRD, pin 14 :
WTR = Winding tachometer right, from a reflection photoelectric barrier. The same applies for the levels as with the FTA.

Comparator 3 : In = WTL, pin 7; Out = WTLD, pin 13 :
WTL = Winding tachometer left, see above (not for BASIC).

Comparator 4 : In = FG, pin 8; Out = FGD, pin 11 :
FG = Capstan tachometer. This signal stems from an amplifier for the tachometer hall sensor on the motor unit. The output impedance is 10 kΩ. The amplitude of the near sinusoidal signal is normally 1 Vp. It may not fall below 300 mVpp. It is AC coupled via a capacitor [2468]. In order for a bias current to flow, the input pin 8 must be passed via a resistor [3491] to the reference voltage at pin 3. A capacitor [2465] for filtering out high-frequency interference is arranged in parallel to the bias resistor.

2.3 Interface to the head-drum motor driver:

The head-drum motor driver IC TDA5241 contains a fully integrated 'start-up' circuit.
The connection of the HMO driver TDA5241 [7300] between the motherboard print and the head-drum motor is provided by a connector pos.1930.

- **REEL** is the Speed-Phase control signal.
  The resolution is 14 bit.

PG/FG is the combined Speed-Position signal of the TDA5241

The current input of the +14M1 is 70mA (normal) at room temperature. During acceleration of the motor, approx. 0.5A may flow for a short period.

2.4 Capstan motor interface:

The driver IC of the capstan motor is activated via connector 1946.
CAP is the CAPstan speed control signal, which varies without load between 0 and 5V.
The rotational direction of the motor is determined with CREV (capstan reverse) The maximum current input of the motor is limited to 1A. Typical values in PLAY mode are 0.2...0.3 A.

2.5 Loading motor driver :

The TMO driver uses a bridged dual-power opamp L2722. The IC can supply +/-1 A output current. It contains short-circuit and thermal overload protection and integrated flyback diodes at the outputs. The output current is limited by the internal resistance of the pin-wound motor (normally 18 Ohm) to approx. 0.7 A (start-up or motor is blocked).
Between the IC outputs (pin 1 and 3), a Boucherot element (1.5Ω, 100 nF) is arranged to suppress a 3 MHz-oscillating tendency at the output stage. One half of the bridge is controlled via the TMO line and functions as a comparator. The other half is an amplifier-integrator with a gain of 3.9. A change of the input voltage (THIO) between 0 and 5 V results in a voltage variation of between 0 V and nearly Ub at the output. With a 50% modulation (THIO = 2,5 V), pin 3 has approx. 7 V. The capacitor in the negative-feedback of the opamp filters out the PWM frequency of approx. 21.5kHz. During a Power On Reset (POR), the TVC sets the THIO line to Low whereas TMO is set to High. In order to ensure that no current flows in the motor during the POR pulse, the aforementioned polarity must be maintained. This prevents the motor's destruction in case of prolonged triggering or blockage. This circuit, however, also has the disadvantage that, if the 5V fails (e.g. blown fuse pos1402), residual voltages may be passed to the IC inputs via the 14V. These residual voltages trigger the comparator and the amplifier in opposite ways, causing a short-circut of the loading-motor's coil. In order to avoid this, a separate reference voltage divider [3445,3446] is used for the comparator section. Both outputs of the L2722 [7440] are then in common mode, therefore protecting the motor.

2.6 Analogue interface to the TVC :

The following analogue levels are supplied to the TVC's internal A/D converter:

- TRIV Tracking Information Video
- TAE/TAS Tape End/ Tape Start Detection
- I/R Logic Information from INIT and Record protection
- AGC Automatic Gain Control

2.7 Tape end - LED control :

The LED current is controlled with the transistor pos 7463. The ON time is approx. 1 msec with an ON/OFF ratio of 0.09.
The LED current is normally 180 mA. In order to prevent interference from the relatively high pulsed current 'spreading' through the entire unit, the LED is fed from the +14M1, and filtered by 2 NFR's [3414, 3415] with 10R each and a 220µF electrolytic capacitor [2459].

2.8 Evaluation of the drive switch:

The drive contains two switches :

- INIT Initialisation switch
- RECP Record protection

The conditions of these two switches can be passed into one of the analogue inputs of the TVC with a single line (I/R). For this purpose, all switch outputs whose levels could be either "H" (5V) or "L" (0 V) are connected to one another via a resistance weighting network. Each possible switch condition combination therefore has a corresponding direct voltage at the I/R line.

2.9 Test picture generation:

The test picture generation (sync, black and white) is carried out with the resistor network [3430, 3431, 3437 and 3471] and is fed into the signal electronics IC [7007].

2.10 Version definition :

Various ROM masks are used. All relevant settings are stored in the EE-PROM in the form of option bytes.

2.11 EE-PROM :

An EE-PROM is an electrically erasable and writable, non-volatile ROM (information remains if operating voltage fails). The R/W cycle is carried out via the serial bus SDA, SCL. It is now possible to store, unit or deck-specific parameters such as X distance, gap position, tuning limits and possibly also differences between TAE and TAS, left - right tolerance of the tape end photoelectric barriers (previously paired photo-transistors were used) in the EE-PROM.
The adjustment of the gap position is carried out automatically in the service test programme with the aid of a test cassette. The preset stations and some options are also stored in the EE-PROM.

2.12 CMT detection :

This was extended due to identification problems caused by weak transmission signals and NON-STANDARD video signals. The CSYNC line is offered to the TVC on pin 6. A hardware integration of the picture pulse compensates the perturbations generated by the "strong" channels on the "weak" channels.

3. Operating unit DC (DE-, DC - Part)

The front controller [7201] is the core element of the operating unit, fulfilling the following tasks with the respective function groups:

Shuttle evaluation

Evaluation of keyboard matrix

Decoding of remote control commands from the infrared receiver pos 7203

Quartz timer

OSD

Integrated RAM for storing timer data

Activation of the display

Bi-directional serial interface for data exchange between the front controller and the deck µP (CLKD1 port P32, DATD1 port P34, DATD2 port P33)

I2C bus interface (SDA port P50, SCL port P36) to TUMOD [1701], VPS/PDC decoder [7540] and EEPROM [7890] on the motherboard

The drifting of the tuner or the aerial signal generates the control voltage AFC in the receiving circuit element (FV) on the motherboard. This voltage is passed to port P53 and the front controller readjusts the tuner tuning voltage.

In case of a power failure, the back-up cell supplies the timer and the RAM via pin 33 for 30 minutes or 7 hours, depending on the model [2997, 220mF gold capacity]. A diode [6299] prevents the back-up cell from discharging. During this time, pin 2 is at LOW level, so that further functions of the IC are switched off by the quartz [1298] at pin 13 / 14.

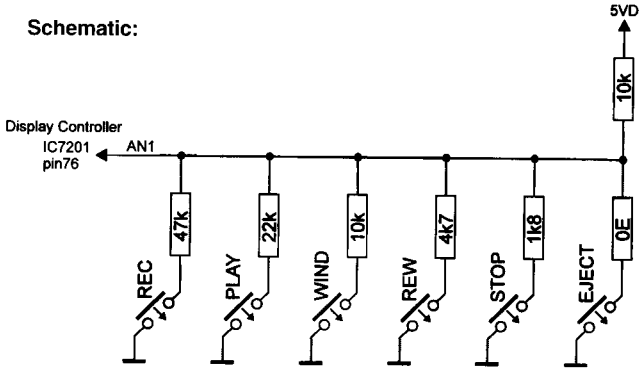
3.1 Shuttle:

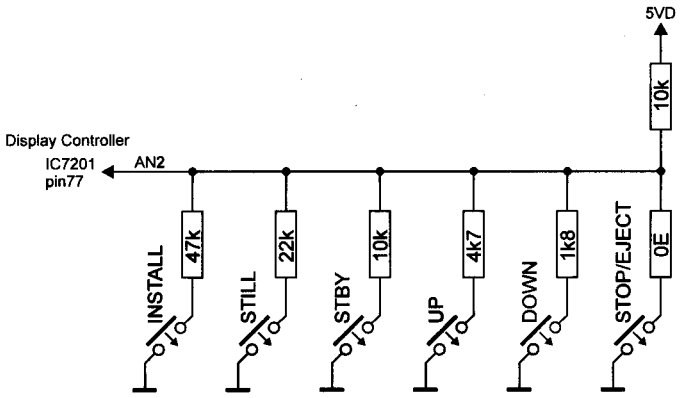
The shuttle EVQ WLG 001, which is electrically connected to the Print QMB1 via connector 1945 represents a binary coded rotary switch with a rotation angle of +/- 70 degrees and 16 switching positions. A spring returns it to its centre position once released. From this position, it can be moved in both directions by 7 or 8 switching positions. All switching conditions are realised by the various electrical connections of the four different shuttle outputs B1 - B4 with a voltage of 5VD (level lift 0V/5V). These shuttle signals are read and evaluated at the input ports P01, P03, P04, P05 of the front controller. A shuttle function is only possible in the NORMAL operating mode.

3.2 Evaluation of keyboard matrix:

There are 12 different keys which are decoded by 2 ports (P51, P52) via 6 assigned DC values each. Each mechanical key position at the print can adopt any key function via 2 coding resistors. The simultaneous pressing of keys may lead to an undesired function. Critical functions such as RECORD and INSTALL cannot be accidentally activated by simultaneously pressing several keys.

Schematic:





3.3 IR receiver and signal evaluation

The IR receiver [7203], which is only operational if the voltage 5VD is present, contains a selectively controlled amplifier and a photo-diode. The photo-diode changes the received radiation (approx. 940nm) into electrical pulses which are then amplified and demodulated. At the output of the IR receiver [7203], a pulse sequence (level lift 0V/5V) corresponding to the envelope curve of the IR remote control command to be received can be measured. This pulse sequence is read into the front controller via the interrupt input P30/INT3 for further signal evaluation.

3.4 Generating the clock pulse:

In the operating modes NORMAL, LOW POWER, STANDBY and POWER OFF, the front controller and the sub-oscillator [1297] generate the clock pulse as the basis for the internal clock and date function. At port P22/XTOUT, a sinusoidal oscillation of 32.768kHz with a level of approx. >3 Vss can be measured with a 10:1 probe. With the backup capacitor fully charged [2297], the backup time is 7 hrs.

3.5 OSD:

The front controller activates the OSD-IC (LC74781 [7800]) via 3 lines (OCLOCK P35, ODAT P37, OCS P20).

3.6 Activation and function of the VFD display:

In principle, the VFD display [7202] is a tube triode in which the heating filaments serve as cathodes (F1,F2). The activation of the 7 VFD grid (G1 - G7) is carried out via P71 - P77 of the front controller, and that of the 16 anodes (P1 - P16) via ports P80 - P87 and P90 - P97 of the front controller, each with a positive potential compared to the cathode.
The grids and anodes (digits and symbols to be displayed) are activated in the time-multiplex procedure (duty 1:16, scanning period 3.9 ms (16 x 244,14 µs), voltage lift 5V/-28V). A dimmer function is achieved by pulse-width modulation of the grid-activation signals. In case of maximum display brightness, the pulse-width for each grid is 214 µs. With the help of software, this can be reduced in several stages to 30 µs, which visually reduces the brightness of the VFD display.
A digit or symbol is only illuminated if the corresponding anode and the surrounding grid are switched simultaneously to 5V for a certain period within a scanning period. The electrons emitted from the cathode are accelerated by the positively charged grid and hit the luminous layer of the anode which is also positively charged.
During the remainder of the scanning period the corresponding grid and parts of the anode are at -28V, due to the internal pull-down resistors. This potential is lower than the average cathode potential of approx. -16V, prevents the acceleration of electrons, thus causing the relevant grid and anode segments to go dark.
The direct heating voltage of the display (U = 6.5V) is supplied from the power supply to pins F1 and F2 of the VFD display via lines HELO or HEHI and via limiting resistors [3253,3254]. The Z diode [6070] clamps the heating voltage to approx. -16V via resistor [3074]. The heating voltage measured between pins F1 and F2 is normally +3.5V_{DC}.

4. VPS/PDC-, OSD-, Follow me - Part

4.1 VPS :

The VPS-IC SDA5642-6 [7540] reads the data sent by the station from line 16 of the video signal (VREC) and issues the information required for the timer start to the front controller. In addition, data such as station name, country recognition, etc., are passed on to the µP.

4.2 PDC/VPS:

The VPS/PDC decoder IC SDA5650 [7540] reads the VPS and also the PDC data from the vertical blanking gap and provides these to the front controller via the IIC bus.
In addition, the time can be read out from the TXT header line (necessary for 'time download').
The date is not queried from the TXT header but via the PDC format 1 (different writing versions of the stations).

4.2.1 The following modes (data formats) are available:

- VPS (Timer data and station name)
- PDC Format 2 (Timer data and station name)
- PDC Format 1 (Station name and date)
- TXT Header line (Time for 'time download')

4.3 Follow Me - Part:

The video signals from the internal frontend of the VCR (VFV) and the VBS signal, which, when compared, corresponds to the TV frontend video signal connected to the Scart1-Input (VIN1), are 'digitalised' via comparators and are then compared. A low at the output of the circuit shows that the picture contents of both video signals are identical and it must consequently be the same station.

4.4 OSD-Part:

The front controller controls the OSD-IC LC74781 [7800] via 3 lines (Clock: OCLK; Data: ODAT; Select: OCS). The video signal VSB is passed from the signal electronics to the input of the OSD-IC [7800 pin 15]. At the same time, the CSYNC is offered to the IC via an inverter [7801] for synchronisation.
From the video output of the OSD-IC pin 13, the signal passes to the I/O part. In the case of Secam signal entries, the front controller activates a bypass between the video-in and video-out via the OSD-IC [7810, 5810, 2810].
With the aid of a LC oscillator [5800, 2800,2801], the IC generates its internal reference for the entry time, character size, etc. From the TVC (Deck-µP), a frame pulse (OFP) is supplied for vertical synchronisation and is passed to pin 20 of the IC.
To generate a coloured background in case of a full page (i.e. blue back) or for internal command processing (OSD system clock), the colour sub-carrier frequency from the signal electronic is doubled (2Fsc: 8.86 MHz) and applied to pin 2 of the OSD-IC.
For units without OSD, the signal electronic (VSB) switches the video signal directly via the resistor [3805] to the I/O part (VOUT).
During full page OSD, the video signal (VSB) is muted via the FFP pulse to improve the crosstalk attenuation.

5. Frontend FV (FV - Part)

5.1 The frontend consists of the following elements :

- TUMOD = Tuner + modulator
- IF amplifier & video demodulator IC TDA 9800 incl. FM demodulator
- IF amplifier & video demodulator IC TDA 9812, 9813,9814 incl. FM and AM demodulator
- FM stereo decoder TDA 9840
- NICAM decoder

5.2 The frontend was designed for the reception of the following systems:

- PAL B/G with FM stereo
- PAL I or PAL BG with NICAM stereo
- PAL BG with NICAM and FM stereo
- PAL BG/I SECAM L/L´ with NICAM and FM stereo
- PAL BG SECAM DK with FM stereo

PAL B/G	=/01,/02/03/11/13/16
PAL I	=/05 Pal I with UHF reception
PAL I Ireland	=/07 Pal I with VHF/UHF reception
SECAM L,L', PAL BG/I	=/39
PAL B/G, SECAM DK	=/59

All frontend variations are according to the norm EN 55020.

The individual components are listed in the respective version of the circuit diagram.

5.3 Tuner modulator (TUMOD)

The tuner and modulator are fitted in the same housing.
Both the tuner and the modulator are PLL controlled. The reception frequency or modulation frequency is set with the IIC bus.
The amplification is determined by the AGC voltage at pin 5 [1701] (for operation, see AGC section).

5.4 IF selection

The IF frequency of the picture carrier is 38.9 MHz for all systems with the exception of SECAM L´ (33.9MHz).
For PAL BG-SECAM DK and PAL BG/I-SECAM L/L´, a quasi-split-sound system is used; i.e. separate surface wave filters (SWF) [1719, 1720] are required for the picture and sound carrier. For all other standards, an intercarrier system is used; i.e. a mutual SWF incl. sound carrier attenuation [1721 for TDA 9800 or 1720 for TDA 9813]. can be used for the picture and sound carrier.
The used sound SWF (K9456M and K9460M) have two different filter characteristics which can be switched.
For the PAL BG/I-SECAM L/L model, an additional circuit for suppressing the adjacent channel sound carrier is provided, which is set with the coil [5721] to maximum suppression at 40.4MHz.

5.5 IF demodulator

5.5.1 TDA 9800T

The output signal of the SWF is initially amplified and then synchronously demodulated. The carrier required for this purpose is regenerated from the input signal via a PLL. The integrated VCO oscillates at double the picture carrier frequency (77.8MHz) and this frequency is internally divided. The loop filter for the PLL is connected to pin 6. The offset current of the phase comparator is compensated with a potentiometer [3748] (tuning to max. audio S/N) to achieve the best possible demodulation. At pin 15, an AFC (**A**utomatic **F**requency **C**ontrol) voltage is available, which is evaluated for station tuning.

At pin 13, a demodulated video signal and the sound carriers at 6.0MHz and 5.5MHz (FM sound) or at 6.552MHz or 5.85MHz (see NICAM sound) are available. After a 6.0MHz or 5.5MHz sound trap, the video signal passes to an internal 6dB buffer (pin 14). A voltage divider and an emitter follower for level adaptation (1Vpp) are arranged at the output of the buffer (pin 7).
An additional widening of the sound trap consisting of pos. 5741, 2793, and 3987, suppresses the second FM or NICAM sound carrier in the video for intercarrier or multi-standard models.

The FM sound carrier passes from pin 13 to output pin 9 of the internal FM PLL demodulator via a 6.0MHz or 5.5MHz sound filter. An external transistor amplifier provides the FM deemphasis and the level adaptation in two Scart models (500mVeff at 27kHz lift, 1kHz audio).

5.5.2 TDA 9813T

The TDA9813T is selectively operated in QSS and intercarrier (PAL BG only, pin 28 to earth). For the IF signal processing of picture and sound, separate internal elements are available.
For video input stage, see TDA9800T. This IC does not require the setting of the phase offset. The loop filter is connected to pin 5. The AFC is available at pin 20. As with the TDA9800T, the video branch is analogue; the second sound trap is not required.
The IC contains an output for the sound carrier at 5.5MHz (6.5MHz) and 5.74MHz (6.258MHz). These are connected to the FM demodulators via filters (pin 14, 15). The audio signals are passed to the stereo decoder TDA9840T for stereo decoding (see below).
For NICAM, a second IF is passed to the QNIC subprint via a jumper.
In the BG/DK stereo model, the second sound IF is selectively passed to the sound filter pair 5.5/5.74 MHz or 6.5/6.25 MHz via a HEF IC [7722].

5.5.3 TDA 9814T

This IC is operated exclusively in QSS. In addition to the TDA 9813, it also contains an AM demodulator for Sec L, L'. The second sound IF is selectively passed to the sound filter pair for FM stereo 5.5/5.74 MHz or 6.5/6.25 MHz for PAL I reception via a HEF IC [7722].

5.5.4 AGC

The two-stage AGC is the same for all ICs. For small signals, the control is only carried out in the IF IC whilst the tuner operates with maximum amplification. From a certain take over point, the IF IC issues a control signal for the tuner. From this input voltage onwards, the control is basically only carried out by the tuner. The take over point is set with the potentiometer AGC-Adj. [3742] to the best sensitivity and input interference immunity.
The IF AGC voltage is supplied to the deck microprocessor via transistor [7724], which passes the information to the front controller via the signal level.
This is used to determine the sequence of the programs to be stored in autostore mode.

5.5.5 FM stereo decoder TDA 9840T

For FM stereo, the signals L+R or 2R are transmitted by the sound carriers. To arrive at the L and R signals, a decoding circuit is required. This computing circuit is implemented in the TDA9840T. The input attenuators can be set with the IIC bus and serve for adjustment of the level and for setting the channel separation.
The frequencies containing the stereo recognition or dual tone recognition are filtered out via a LC network. For dual tone or MONO, the aforementioned computing circuit is deactivated.
The deemphasis is carried out internally by the capacitors [2789 and 2790].
In the NICAM and FM stereo models, the output signals of the NICAM part are passed to the output selection switch of the TDA9840T (pin 9,10) and the audio signal is selected in the TDA9840T (outputs pin 13,14) via the IIC bus with the aid of software.

6. NICAM decoder SAA 7284ZP - QNIC

The IC SAA7284 is a NICAM decoder which does not require any adjustment. It is realised on the QNIC subprint.
The NICAM signal is filtered out by internal filters and is converted into the basic band. The signal is then demodulated and decoded. The digitised audio signal is converted into an analogue signal via a D/A converter.
In addition to the NICAM decoding, an audio switch is available (inputs pin 7,16) via which the internally or externally demodulated audio signal can be selected.
This switch is used to switch over to the FM audio or AM sound at SECAM L/L in case of incorrect NICAM decoding or a NICAM carrier not being available.
Two low passes with an amplification of approx. 6dB are connected to the output which remove the carrier rests from the audio signal.

7. Video signal processing VS (VS-, IO-, AL - part)

7.1 Switching functions of the signal electronics IC LA71525:

The signal electronics IC LA71525 [7007] is activated at pins 63 and 64 of the deck uP via the I2C bus.

REC/PB
via IIC bus
during RECORD pin 19 (REC HIGH OUT) goes to 5V

PAL/SECAM/MESECAM/NTSC
via IIC Bus
during NTSC playback, pin 43 goes to 5V

SP/LP/SLP
via IIC bus

VIDEO INPUT SELECTION SWITCH
the video at pins 28 (Scart) or 32 (frontend) can be selected and switched via the IIC bus.

VIDEO ENTRY
at pin 33 (FFP), the artificial picture pulse for the playback features and the test picture for the device installation are entered.:

Loop-through	< 0,8V
Test picture	= 1.2 ... 3.3V
art. picture pulse	> 3.7V

COLOUR VECTOR
the colour vector is influenced with the aid of pin 67 (CSCP):

normal	< 0,8V
LP features colour	=

7.2 Recording :

7.2.1 Luminance

The input signal (pin 28 = Scart , pin 32 = frontend) is switched in the IC [7007] and is available at pin 34 as VREC with 1Vss. It is passed to pin 35 via an electrolytic capacitor. In the IC [7007], the video signal passes through an amplification control (time constant determined by C [2005]). After the AGC, the signal is passed to a clamping stage where it is attenuated by 6 dB and from which it is passed to a chroma separation 3.5 MHz low pass filter and to the vertical emphasis (out: pin 42, in: pin 40). This emphasis consists of a 1H-CCD delay line in IC [7003] (in: pin 5, out: pin 7) and an emitter follower [7005]. Next, the signal passes from pin 25 to pin 26 via another emitter follower [7002]. The filter at the base of the emitter follower does not function in the REC mode due to the low resistance of the emitter follower. The Y signal then passes through the detail enhancer, the non-linear emphasis, the linear emphasis (time constant via pin 23,24) and the white/dark clipping stage.
The signal generated thus then directly activates the FM modulator. Before the FM signal leaves the IC at pin 18, it passes through a further low pass filter. Then it is passed to the addition point (FMRV) with the chroma signal, via an external emitter follower [7006].

7.2.2 Chrominance PAL

The arriving video signal (pin 35) is separated from the chroma signal by a band pass filter (BPF1) and is then passed to an ACC stage. The ACC amplification stage controls the chroma amplitude for the subsequent stages (time constant via capacitor at pin 13). The chroma signal is then passed on by the main converter. The main converter mixes the 5.06MHz sub-carrier of the sub-converter with the 4.43 MHz chroma signal to the 627kHz chroma FM signal.
The sub-carrier is a mixed product consisting of 4.43MHz (the REC APC compares the quartz and burst frequency; time constant at pin 54) and (40+ 1/8) fh = 627kHz (generated by 321fh -VCO, time constant pin 49/51 and the phase rotation according to the VHS standard, control pin 66). Via a band pass filter and the colour killer stage, the converted chroma signal is passed to pin 14 of the IC from where it is directly added to the Y-FM signal via an adjustment regulator [3007]. The colour killer can either identify the incoming signal itself (PAL yes/no, PAL: Chroma signal out, SECAM L: Chroma signal killed) or can be set to PAL or SECAM L via the I2C bus. Apart from being a reference frequency, the quartz oscillation (pin 56) serves for the chroma processing and also for the clock frequency generation of the CCD stage [7003, pin 10].

7.2.3 MESECAM

The signal path is nearly identical to that of the PAL system.

Differences to the PAL system:

- No phase rotation
- The filter characteristic of the chroma band passes becomes wider
- Free running quartz frequency
- The deck microprocessor [7400] generates the MESECAM control signal via the IIC bus

7.2.4 SECAM L

The FBAS signal (VREC) of the IC [7007] passes via the emitter follower [7101] to the cloche filter, which cancels the transmitter RF-preemphasis. In the Secam L- IC pin 29 [7110], the signal passes through a 15dB amplifier and a frequency divider. The latter generates the 1.1 MHz signal required for recording by frequency division (1:4) of the chroma signal. The signal is then passed to pin 21 containing the subsequent band pass filter. The band pass filter attenuates the harmonics generated during the frequency division. At the same time, the chroma signal is blanked at this stage for the duration of the line synchronous pulse. The signal then passes through a 10dB amplifier and is switched to pin 15 on an anticloche filter. This filter generates the FM preemphasis provided as standard for a Secam chroma signal. This is then added to the luminance FM signal at the addition point (FMRV) as a CSR signal.

7.3 Playback :

7.3.1 Luminance

The FM playback signal is passed from the head amplifier [7150] as a FMPV to the signal electronics [7007], pin 15. In the IC [7007], the level of the envelope curve is regulated before being filtered in the FM processing. At pin 17, the signal leaves the IC, passes via a phase shifter and a transistor stage for adapting the filter characteristic and then re-enters the IC [7007] at pin 20. The FM signal limited with a double limiter is demodulated and filtered with a low pass filter. The demodulated Y signal still contains the preemphasis from the recording. This now removes the linear deemphasis at the base of the emitter follower [7002].
The filter circuit is effective, as pin 25 becomes an open-collector output during the playback mode, whose load impedance is determined by the deemphasis circuit. A peaking stage lifts the frequencies by approx. 2 MHz (time constant pin 22).
The Y signal is then clamped, filtered with a low pass and passed through the vertical noise canceller or dropout compensator. For this purpose, the Y signal leaves the IC [7007] (out: pin 42, in: pin 40) and is delayed by 1H in IC [7003]. The CCD-1H-delay line functions for the Y signal as a comb filter (vertical noise suppression) and as a line store for the dropout compensation.
Subsequent switching stages: non-linear deemphasis, horizontal noise canceller and the picture control circuit for sharpness. Then the chroma signal is added to the luminance signal and is output as the FBAS signal (pin 38).

7.3.2 Chroma PAL

At pin 15, the FMPV signal is passed from the head amplifier to the signal electronics IC [7007]. With the aid of an internal low pass, the 627kHz chroma signal is filtered from the FMPV signal. The ACC amplifier amplifies and regulates the chroma amplitude. In the main converter, the chroma signal is mixed with 5.06 MHz to the original 4.43 MHz. The 5.06 MHz are generated during playback by the free-running quartz oscillator and the (40+1/8) fh = 627 kHz frequency derived from the 321fh-VCO. After the main converter, most of the adjacent crosstalk is removed from the chroma signal by 2H comb filters [7003]. The chroma signal is then filtered by a band pass, checked by the colour killer, looped-through via pin 46 and 45 and added to the Y signal.

7.3.3 Chroma MESECAM DK

The signal path is nearly identical to that of the PAL system.

Differences to the PAL system:

- The 321 fH VCO is synchronised by the sync
- No phase rotation
- The comb filter is not active
- Internal band pass filters have a wider band width
- The deck microprocessor [7400] generates the control signal for SECAM B/G via IIC-Bus

7.3.4 Chroma SECAM L

During playback, the FM-Signal is passed from the band (FMPV) to pin 23 [7110], amplified by 6dB, passed through the same band pass as during recording and is then amplified once again by 10dB. From pin 16, the NF preemphasis of the recording is cancelled. The anticloche circuit from the recording now acts as a cloche circuit.
The signal is modulated in the subsequent stages (AGC) and its frequency is doubled. The band pass at pin 10 removes unwanted harmonics from the signal before its frequency is doubled again. In order for the signal to become a standard Secam chroma signal, it is provided again with a RF preemphasis (anticloche). The chrominance signal then passes through a colour killer stage, a band pass filter and an emitter follower [7106], before reaching pin 46 of the signal electronics IC [7007] as a CSP signal via a coupling capacitor.

7.3.5 NTSC

During playback of NTSC signals, the original NTSC chroma is converted to a PAL chroma signal (control signals, see above). This requires an internal IC conversion in the chroma part, as well as a conversion in the CCD-IC [7003] to an 1H comb filter for crosstalk reduction. Line and picture frequencies do, however, remain unchanged according to the NTSC standard.

7.3.6 PAL M,N

as chroma PAL (7.3.2)

8. Audio linear AL (VS-, IO-, AL - Part)

The signal inputs for recording or loop-through (EE) are pins 71, 73 and 75 of LA71525 [7000]. During record and EE, the selected signal passes through the linear amplifier and then to the mute stage before leaving the IC at pin 77. This is the output leading to the IN/OUT part or the AF part in stereo units. The attenuation chain at pin 77 sets the level required for the ALC (**A**utomatic **L**evel **C**ontrol) detector, whose time constant is determined at pin 72, and the level for the recording amplifier. L5601,R3657 and C2657 form the preemphasis for the recording amplifier.
The output of the recording amplifier is pin 1. Resistor [3604] then adds the recording current to the bias current, from which the current passes via the head to pin 5, where the switch is closed. During playback, the switch is closed at pin 7. The playback signal is amplified in the equaliser stage (time constant between pin 8 and pin 9) and the Pb level [3160] is set with the potentiometer. The potentiometer [3160] compensates for amplifier and head tolerances. The resistor [3605] and the capacitor [2600] determine the head resonance during playback.
In longplay, mode the frequency characteristic is adapted with RC networks [C2656, R3655] for record and [C2601] for playback.
The known circuit , running at approx. 70 kHz, is used as the erase oscillator for the erasing heads and bias current. To avoid interference peaks, the oscillator should be switched on slowly (switching stage T7603, time constant C2617, R3623 and current limiter R3625).
The bias current is set with the potentiometer [3618].

9. IN/OUT (VS-,IO-, AL - Part)

9.1 General:

The signal (VSB / VOUT) from the output of the signal electronics IC [7007] pin 38 or OSD [7800] pin 13 is offered to the TUMOD [1701] pin 1 as VMCO via the emitter follower [7501 / 7500].
After the Video- Input selector of the signal electronics IC [7007], the VREC signal is available at pin 34. The signal is passed to pin 35 (Y and PAL chroma signal processing), to SECAM VS part (SECAM chroma) and to the VPS/PDC part (data recording).

9.2 Video: 1-Scart devices

The selection of the video signal is exclusively made by the signal electronics IC. The frontend signal VFV (IN3/Pin 32) and VBS (IN1/ pin 28) are directly applied. The VBS signal in the I/O part is directly connected to VIN1 via [3509/3510].
IN2 pin 30 of the signal electronics IC is used as 'Mute position' (active during playback).

9.3 Video: 2-Scart devices

The STV6400 [7507] receives the following signals at the inputs: VFV, VIN1, VIN2, VFR, VOUT (via emitter follower 7501). In the STV6400, the input for the signal electronics signal VOUT (2 Vpp) contains a divider (1/2). The outputs pin15 and pin16 contain a 6dB-amplifier and feed the signal to the respective Scart connector. OUT1 Pin2 has no amplifier, this output leads to the signal electronics VS (VBS) at the Video- Input selector (IN1/pin 28). In 2 Scart sets, the video input selector of the signal electronics IC is always set to IN1.
The front controller switches the individual input signals to the respective outputs via the IIC bus.

9.4 Audio: 1-Scart mono

The input select is IIC bus controlled in the signal electronics IC [7007]. For this purpose, a selection can be made between the AIN1 pin 71 and AF1 pin 73 signals.
The output signal AMLP pin 77 is applied to Scart 1 and the modulator.

9.5 Audio: 2-Scart mono

The input select is IIC bus controlled in the signal electronics IC [7007]. For this purpose, a selection can be made between the AIN1 pin 71 and AF1 pin 73 and AIN1 pin 75 signals. The output signal AMLP pin 77 is always applied to the modulator.
The output signal for Scart 1 is selected with 1/3 HEF4053 [7513] by the control line MON pin 9 from AMLP pin 5 and AIN2 pin 3.
The output signal for Scart 2 is selected with 1/3 HEF4053 [7513] by the control line DEC pin 10 from AIN1 Pin2 and AF1 pin 1

9.6 Decoder operation: (REC or STOP)

9.6.1 Program position with decoder (Frontend)

The frontend signal is supplied to the decoder connected to Scart 2 and from there via VIN2 or AIN2 back to the VCR.
9.6.2 is not possible for these program positions.

9.6.2 External input with decoder

The signal from Scart 1 (normally TV set) is supplied to the decoder connected to Scart 2. For scrambled programs, the decoder switches pin 8 to high. The VCR then passes the decoded signal from Scart2 to Scart1.

10. Audio AF-, I/O part for stereo sets (AF part)

10.1 General:

All audio input and output selection switches as well as the linear audio and the hi-fi FM audio signal processing are arranged in the TDA9604 [7850]. This IC is exclusively controlled by the IIC bus. The carrier frequencies and band pass filters for the FM audio part are independently adjusted by the TDA9604. This adjustment is started via the IIC bus after a mains reset. The HP2 signal is used as a reference for this purpose (pin 40).

10.2 Audio IO

The input and output selection switches are exclusively controlled by the IIC bus. Audio signals from the frontend, both Scart sockets and the front sockets are passed via pins 1 to 8 to the two input selection switches, which select the respective signals for the FM and linear audio part. The output selection switch for Scart1 and Scart2 (pins 9,10 or 15, 16) independently select the respective signal sources.
The RFAGC limits the maximum amplitude of the signal to the modulator (AMCO) to prevent overmodulation.
The TRIA / ALI line passes (controlled via IIC) the size of the audio signals or the level of the playback envelope curve (3.5 nominal at PB) to the deck processor. These audio levels are required for recording from the SCART and front sockets to prevent overmodulation of the FM carrier. (In case of excessive audio signals, these are attenuated via the IIC bus with the aid of the VOLUME regulator).

10.3 FM audio

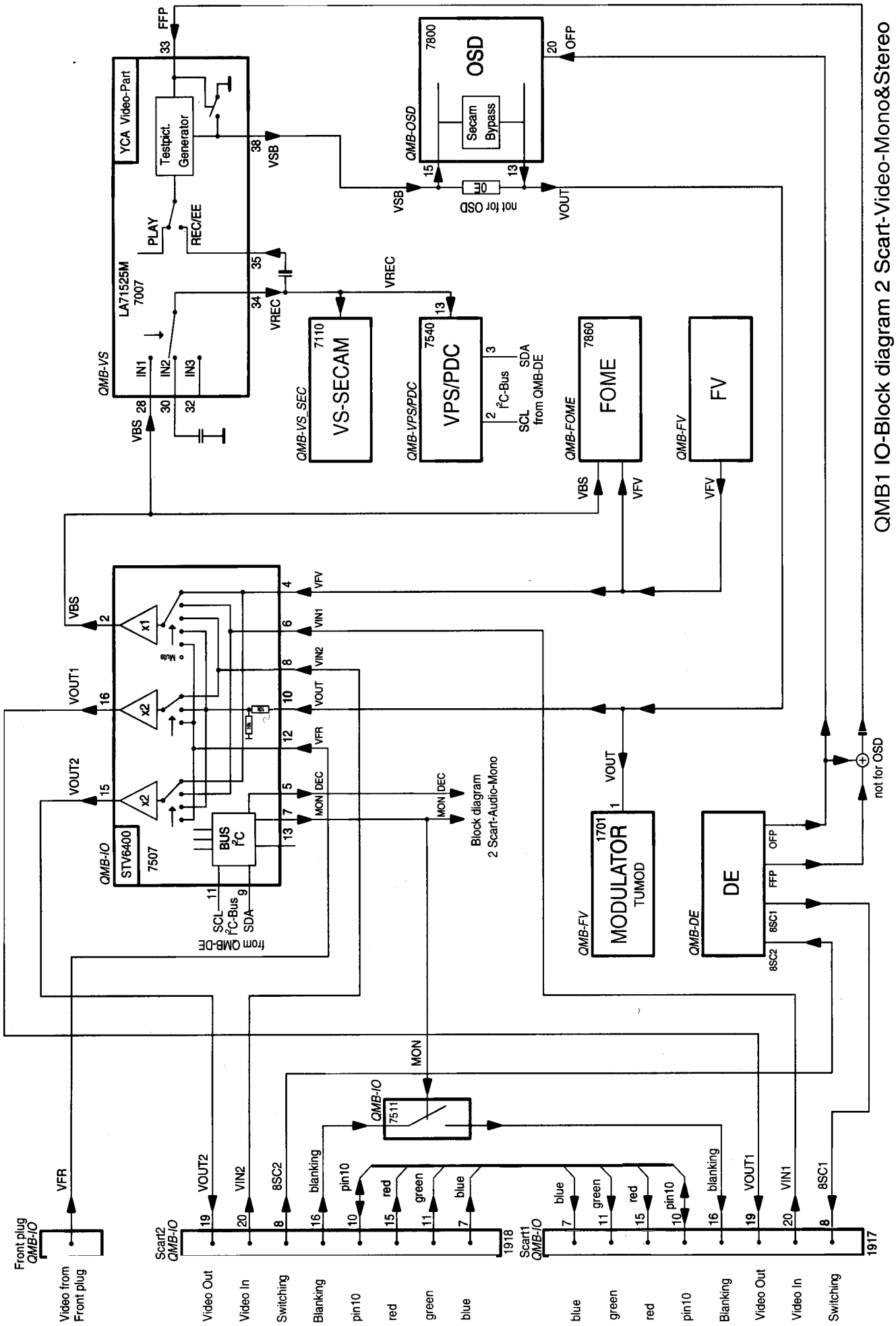
10.3.1 Recording:
The signal from the input selection switch (INPUT SEL) is passed via a level adjuster (VOLUME) and a low pass filter (fg> 30kHz) to the NOISE REDUCTION block, compressing the dynamics during recording. The compressed signal is passed to both FM modulators (1.4MHz and 1.8MHz carrier frequencies). Both carriers are added and are passed to the head amplifier via pin 36.

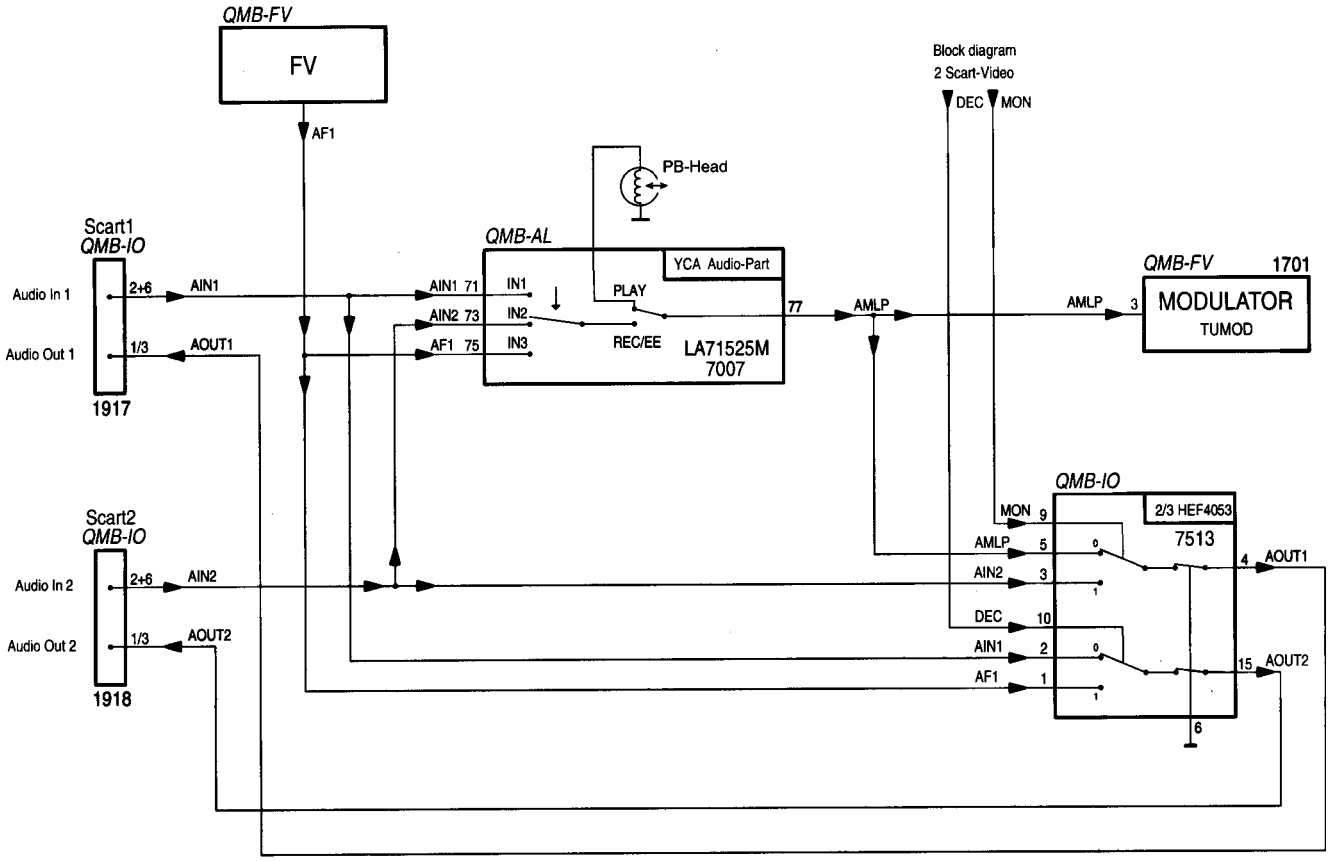
10.3.2 Playback:
The signal from the head amplifier is passed to the HF-AGC via pin 37 where the tape and heads tolerances are compensated. The FM signals are passed to the PLL demodulators via both band pass filters and the limiter. Using a Sample & Hold stage, head switching noise is cancelled (triggered by HP2 signal). The demodulated signals are then expanded in the Noise Reduction stage. Next, the hi-fi signals are available at the output selection switches. If no FM playback is present, the IC automatically switches the output selection switches to linear audio.

10.4 Linear audio interface

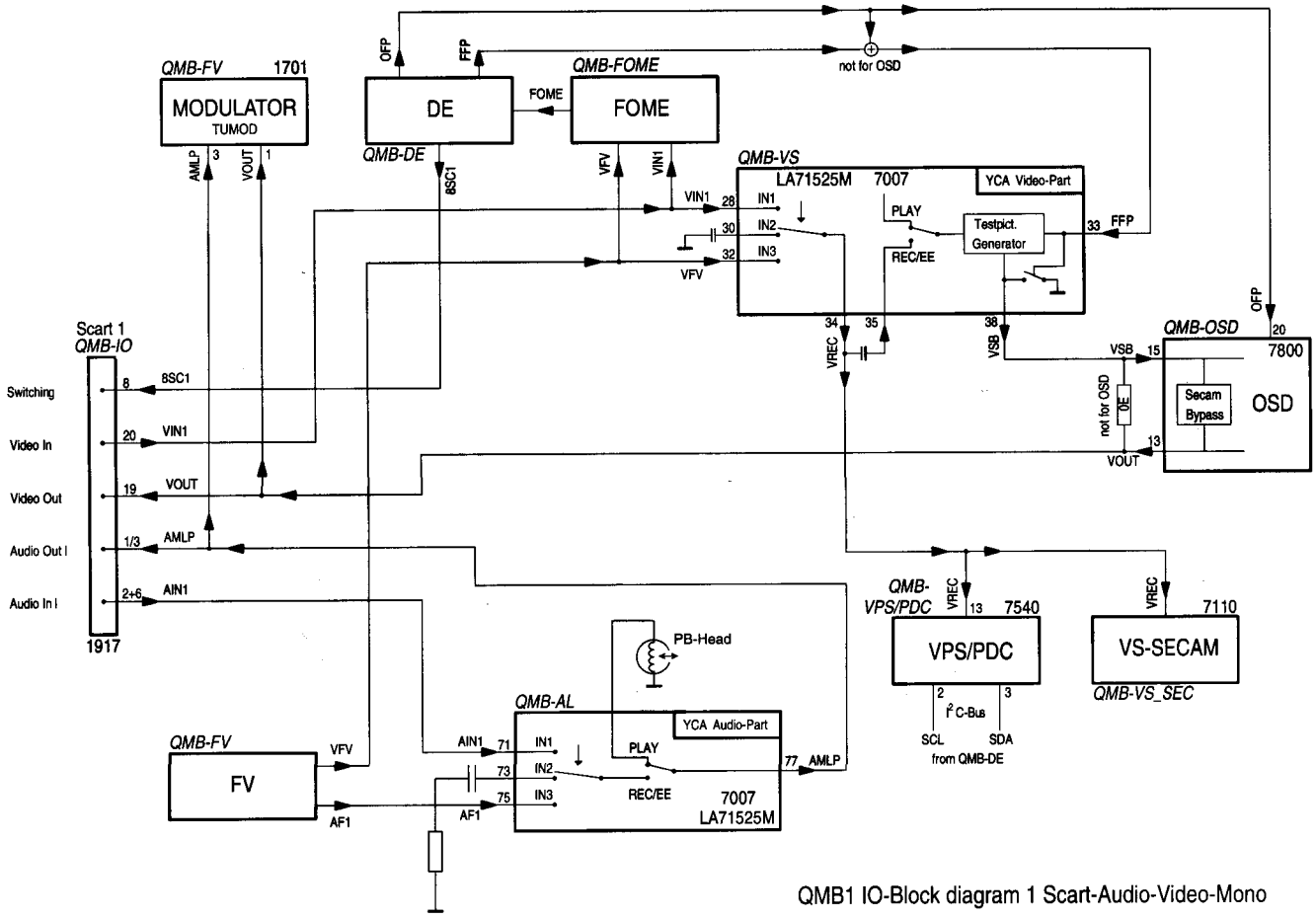
In recording mode, the input selection switch NORMAL SEL in the TDA9604 [7850] selects the audio source for the linear audio part in the signal electronics IC (LA72525) and passes this signal to pin 17 (AMLR).
In stereo sets, the input selection switch of the signal electronics IC LA71525 [7007] is always set to IN2 (pin 73).
During playback, the AMLP signal is passed from the linear audio part in the signal electronics IC pin 77 via pin 19 of TDA9604 [7850] to the PB level adjuster (NILevel), which can be adjusted via the IIC bus in the service mode.

Simple Blockdiagram



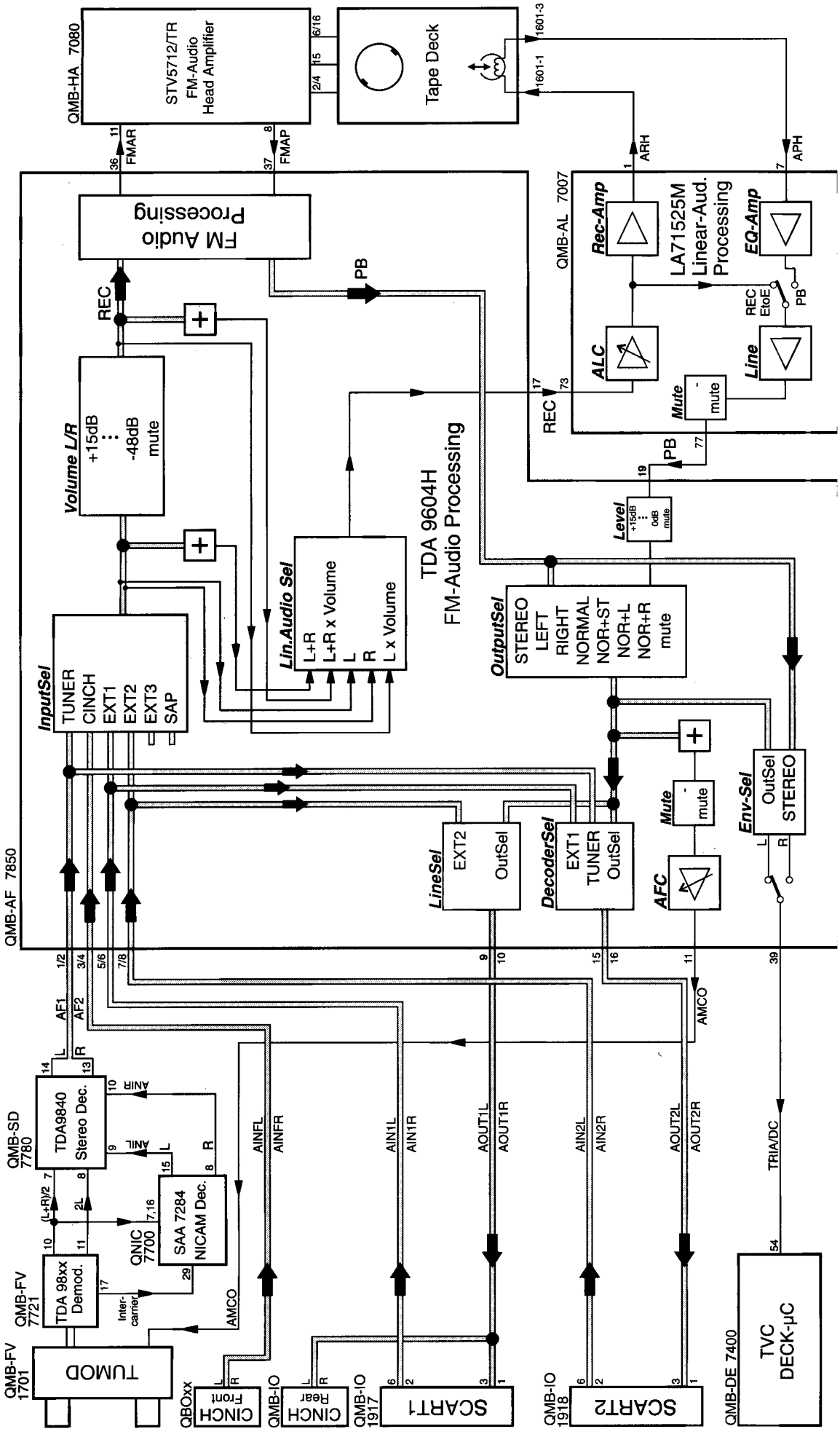


QMB1 IO-Block diagram 2 Scart-Audio-Mono



QMB1 IO-Block diagram 1 Scart-Audio-Video-Mono

Simple Blockdiagram FM Audio / Linear Audio processing



SERVICE MODES

1. Special functions

Erasing the EEPROM

- Disconnect from mains

- Push and hold down the Standby key, reconnect to mains and keep the Standby key depressed for a further 3 sec.

All EEPROM data will then be erased and initialised (timer and transmitter channels). The internal processor RAM will also be erased, but the option codes, deck parameters and adjustment values are maintained.

After changing the EEPROM or MOBO

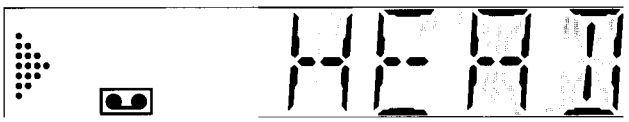
the following steps must be carried out:

Step 40: Option code input
Step 51: Gap position adjustment
Step 52: 'Studio Picture control' adjustment
Step 53: Input of clock correction
Step 60: Level adjustment - Stereo (optional)
Step 61: Channel separation adjustment - Stereo (optional)
Step 62: Adjustment of Audio Linear Playback Level (optional)
Step 99: Clock frequency output

Video head cleaning

With the recorder set to PLAY, the video heads can be cleaned by pressing the PLAY key again for more than 5 sec. The recorder then moves to STOP and the video head cleaning roll is pressed against the running head drum for 10 sec. The recorder automatically returns to PLAY.

The display shows:



2. Service test program

2.1 Introduction

The software program for the control, deck and operating microprocessors includes a service test program. It was divided into the following steps, with the following 'modes':

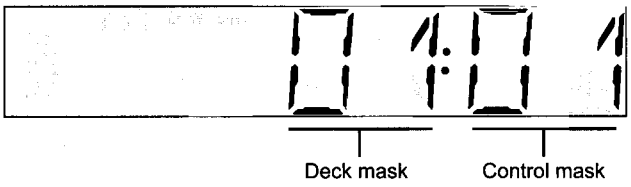
Step 00: Display of mask version number
Step 01: Check of the drive positions
Step 02: Display of the deck - error codes
Step 03: Deck - sensors and manual tracking
Step 04: Display of operating hours counter
Step 10: Operation without drive - dummy mode
Step 40: Option code input
Step 51: Gap position adjustment
Step 52: 'Studio Picture control' adjustment
Step 53: Input of clock correction
Step 60: Level adjustment - Stereo (optional)
Step 61: Adjustment of channel separation - Stereo (optional)
Step 62: Adjustment of Audio Linear Playback Level (optional)
Step 99: Clock frequency output

In the service test program, all drive functions apart from the channel search and channel change mode can be carried out. The program position set **before** entering the service test program is maintained.

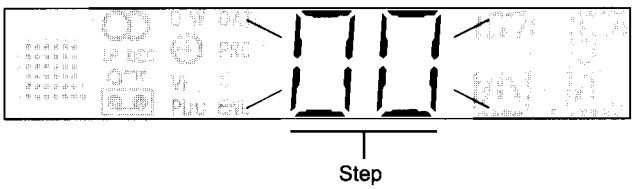
2.2 Activating the service test program

Press and hold down the STOP key on the remote control. Then press the PLAY key on the recorder and keep it depressed for at least 5 sec. The STOP key on the remote control may be released whilst the PLAY key on the recorder is pressed.
The service test program can be selected in any operating mode apart from the channel search, install, clock set-up and cassette length calculation mode. The recorder and all drive functions are fully operational in the service mode.

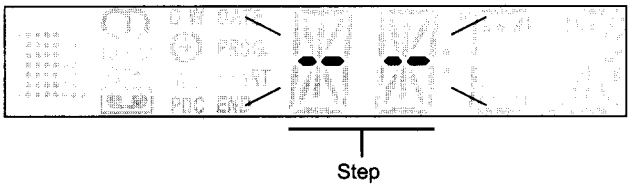
The display shows, for instance



By pressing the SELECT key on the remote control, all step modes may be left and the currently selected step number appears and flashes.



Other service steps are selected with the UP and DOWN keys or the numerical remote control keys. By pressing the SELECT key on the remote control whilst the Step is flashing, the respective mode can be entered or left.
If a step is selected to which no mode is assigned, the displays shows - - and flashes.



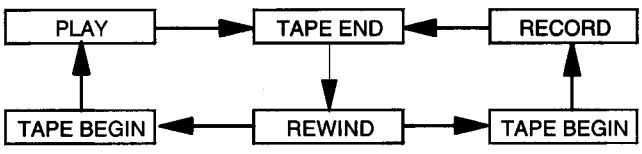
To leave the service program, press the STAND-BY key or disconnect recorder from mains.

2.3 Service mode functions

Endurance test

In the service test program, the recorder can be endurance tested. For this purpose, use a cassette and activate "PLAY" or "REC". The functions are then repeated continuously. In RECORD, the recorder does not move to EJECT at the tape end, but to REWIND, after which it starts to RECORD again. This test serves to detect intermittent faults. The last error is stored in the EEPROM. (The fault remains stored even after a power failure).

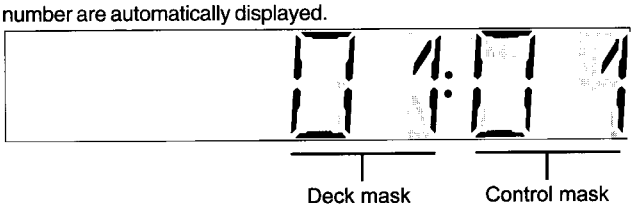
The endurance test is ended by pressing STOP or leaving the service test program.



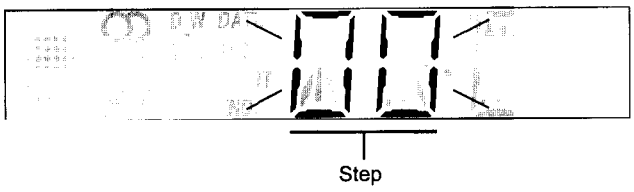
2.4 Description of steps with modes:

Step 00: Display of mask version number

After activating the service test program, step 00 and the mask version number are automatically displayed.



The mode can be left again by pressing the SELECT key on the remote control. The currently selected position number appears and flashes on the display.



A step between 00 and 99 can now be selected.

Step 01: Checking the drive positions

By pressing the SELECT key whilst Step 01 is flashing, the drive position appears on the display.
The FTA signal from the photoelectric barriers which controls the revolutions of the loading motor is used to check the drive condition.
The drive position is shown as a 3-digit decimal number by counting the FTA pulses on the display.

(e.g. 213 = Play)

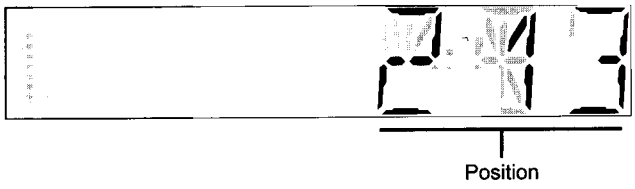
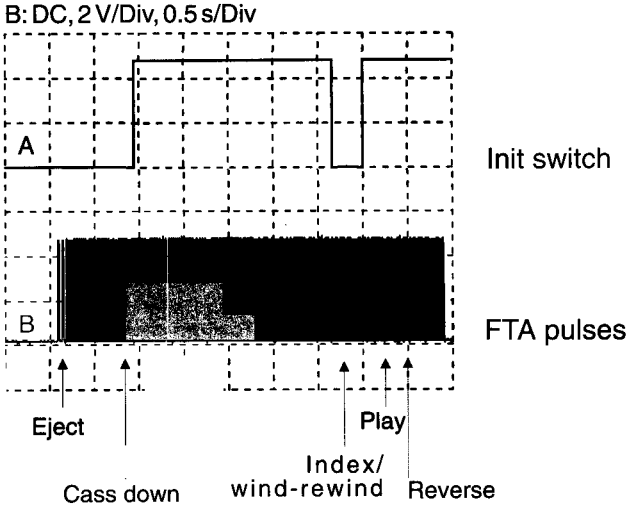


Table of drive positions:

Status	Position (FTA dec)
Eject	007 +2/-2
Index	191 +0/-2
Stop	200 +4/-4
Play	213 +4/-4
Reverse	237 +2/-0

Function of the Init switch:
The diagram shows the function of the Init switch, depending on the position of the deck. The number of FTA pulses is important for the position of the drive.

A: DC, 2 V/Div, 0.5 s/Div
B: DC, 2 V/Div, 0.5 s/Div



Step 02: Display of the deck error codes

By pressing the SELECT key whilst Step 02 is flashing, the deck error code is shown on the display.

Checking the drive function
Loading and unloading time
The signal (FTA) of the photoelectric barrier which controls the revolutions of the loading motor is used as a reference for the loading and unloading time.

Stopping of supply or take-up reels
The tacho signals of the left (WTL) and right (WTR) winding disks are used as control reference.

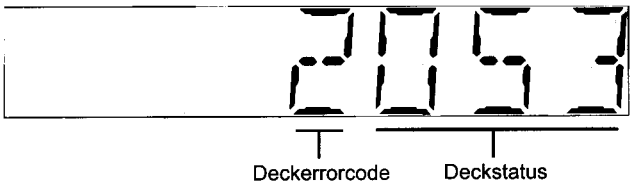
Stopping of head drum motor
This is monitored with the PG/FG signal. The signal is discharged from the e.m.f. of the non-conducting spools of the head cylinder motor, showing the position of the head cylinder.

Capstan motor fault
This is monitored with the FGD signal

If one of the above sensor signals is not available, the recorder tries to put the lift into the "EJECT" position.

Explanation of deck error codes and deck error status
The last error code is stored and remains in the EEPROM, even if the recorder is disconnected from the mains.
The error code can be **erased** by pushing the CLEAR button on the remote control.

The display shows, for instance:



The left digit shows the error:
(e.g.: Error 2 = Capstan error)

Error table:

0	no error
1	threading error
2	no capstan pulses
3	tape broken
4	no pulses left reel
5	no pulses right reel
6	head motor error

The 3 digits on the right represent the deck error condition:
(e.g.: 053 = during Play)

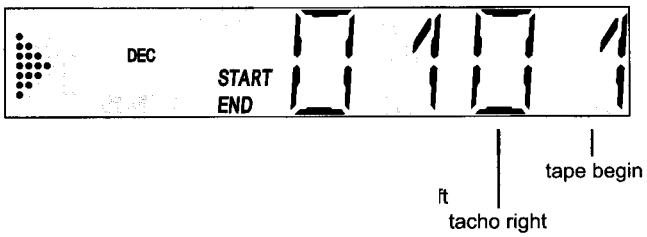
Functiontable:

012	Standby	114	VISS write	211	Slowmotion 1/24
014	Autotracking	115	Viss erase	212	" " 1/14
031	Play-3	125	Tuner - Stopout	215	" " 1/7
034	Slow_reverse	126	Auto Remain Funct.	216	" " 1/2
041	Still Picture	130	ATTS Function	217	" " -1/24
042	Fast	168	Frame+	218	" " -1/14
044	Play-9	169	Frame-	219	" " -1/7
045	Eject	170	Play-11	220	" " -1/2
046	Play9	171	Play-7	222	Edit Record
047	Play-1	172	Play-5	223	Align of Gap
048	Pause	173	Play5	238	Pause
050	Rewind	174	Play7	239	SPC align
052	Wind	175	Play11	246	Edit Pause
053	Play	196	Tuner - Eject	247	Slow motion 1/10
054	Stop out	197	Standby Eject	248	" " 1/18
055	Record	199	Audio Dubbing	249	" " -1/10
112	Index next	202	Audio Dubb. Pause	250	" " -1/18
113	Index previous	206	Reset Tapecounter	253	Key Released

The error code can be reset in this step with the CLEAR key.

Step 03: Deck sensors and manual tracking

By pressing the SELECT key whilst step 03 is flashing, the deck sensors will be displayed in one digit as either 1 or 0.

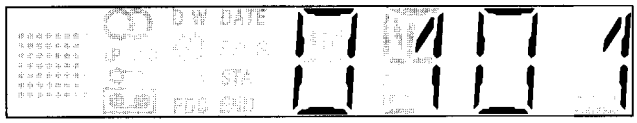


■ ● ◄ ► are used to display the deck status
START init switch (INIT)
END record protection (RECP)
DEC Loading pulses (FTA)

In the service test program, the tracking is always in the centre position.
Only in this step can the value for the required tape running setting be changed, manually in the PLAY function with the UP / DOWN keys. After leaving the mode with the SELECT key, the tracking value always resets itself to the centre position and cannot be changed.

Step 04: Display of the operating hours counter:

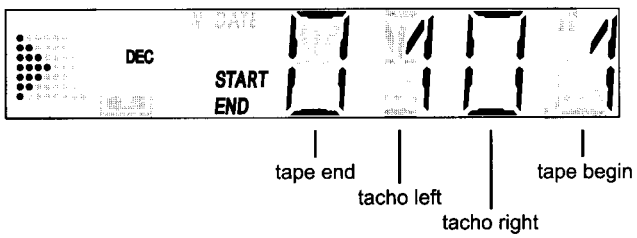
By pressing the SELECT key whilst step 04 is flashing, the operating hours counter shows how many hours the head disk has turned. The hours are displayed as a 4-digit decimal number.



Step 10: Operation without drive - dummy mode

Before activating this mode with the SELECT key, the recorder must be in the EJECT position.

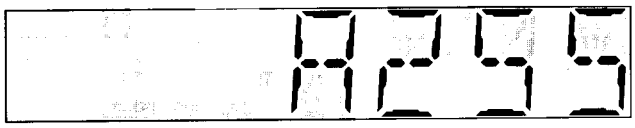
Enter the mode by pressing the SELECT key. The motors are then switched off and the sensors will be ignored by the deck microprocessor. The drive can now be dismantled from the motherboard (see dismantling instructions). **Only install drive if recorder is disconnected from mains.** For signal tracking, the recorder can be set to all drive conditions, i.e. signal electronics, audio and IO processing are switched to the respective operating mode.



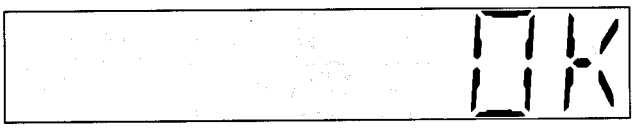
■ ● ◄ ► are used to show the deck status
START init switch (INIT)
END record protection (RECP)
DEC loading pulses (FTA)

Step 40: Option code input

If a new EEPROM is installed in the course of repairs, it must be initialised.
By pressing the SELECT key whilst step 40 is flashing, the decimal option A appears in the display.



By entering a 3-digit decimal code, the correct features are set.
These codes are shown on the type-plate of the recorder.
After pressing the OK key on the remote control, the entered code is saved. The display shows OK for approx. 3 sec. and then the stored value in decimal format.



By pressing the UP and DOWN keys, the available options (A to E) can be selected. The display shows the last stored value in decimal format.

In case of an invalid entry (value >255) the activation of the OK key causes the content of the last stored option to be displayed and OK does not appear in the display.

Depending on the model, some bits are software or default protected and cannot be changed by an entry. In this case, the display shows OK, but the display returns to the **default value.**

3. Adjustments in the service test program

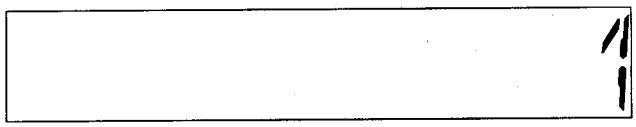
Step 51: Setting the gap position (GAP)

Purpose: To determine the correct head switching point during playback.

Symptom if incorrectly set:
Head switching fault and/or vertical picture flickers.

- Enter the service test program whilst step display is flashing, and enter the step number using the numerical keys.
- Insert a test cassette (e.g. 4822 397 30103) with the standard video signal in the VCR.
- By pressing the SELECT key whilst step 51 is flashing, the automatic adjustment is triggered and stored in the EEPROM .

After a correct adjustment, the display shows 1; 0 when incorrect
To leave the step, press Select.



Causes of incorrect adjustment : Incorrect standard video signal.
Scanner fault.
Microprocessor fault.

Step 52: "Studio Picture control" adjustment

Purpose: Adjustment of the reference level for the SPC.

Symptom if incorrectly set:
The picture is played back at a lower resolution than would be possible.

TP	ADJ.	MODE	INPUT
		Stop Service Mode	RF or A1- input, black picture without BURST
TAPE		MEAS. EQ.	SPEC.
SPC Alignment Tape			Call up Step 52 of Service Mode

- Video signal via Scart or aerial
- Enter the service test program and, whilst the step is flashing, input the step number 52, using the numerical keys.
- Insert cassette (not a SVHS cassette).
- By pressing the SELECT key whilst step 52 is flashing, the recorder makes a recording in SP mode (approx. 10 sec.) and in LP mode (approx. 10 sec.), rewinds and carries out a playback with automatic adjustment.
- After a correct adjustment, the display shows 1 and 0 for incorrect adjustments.

To leave the step press SELECT.

Step 53: Inputting the clock correction

Before carrying out step 53, the correction value must be established in step 99.

By pressing the SELECT key whilst step 53 is flashing, the display shows, for instance:

Using the numerical keys of the remote control, the established correction value from Step 99 is entered as a 3-digit number (value must be between 0 and 255).

After pressing the OK key on the remote control, the entered code is stored, the display shows OK for approx. 3 seconds and then the stored value in decimal format.

In case of an invalid entry (value >255), the activation of the OK key causes the content of the last stored value to be displayed and OK does not appear in the display.
To leave the step press Select.

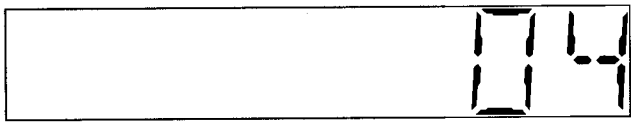
Step 60: Level adjustment of Stereo TDA9840 (only for stereo units)

Purpose: Amplification adjustment of stereo demodulator TDA9840 [7780].

Symptom if incorrectly set:
Sound is too low or too loud

TP	ADJ.	MODE	INPUT
Pin 1 of Scart 1 (Audout)	refer to description	Stop Stereo	RF - input,white picture,1kHz sound only on right channel +/-27kHz deviation
TAPE		MEAS. EQ.	SPEC.
		AC Millivoltmeter	500mV$_{RMS}$ ±50mV

By pressing the SELECT key whilst step 60 is flashing, the output select is switched to stereo and the display shows, for instance:



- Connect the millivoltmeter to Scart1 pin1(Audio out right).
- The level on Scart 1, Pin1 (Audio out) can be adjusted to the set value by pressing the UP (value increases) or DOWN key (value decreases).
  (The amplitude changes by 0.5 dB each time the key is pressed).
  The range is shown in the display with the numbers 1-9.
- The value is automatically stored in the EE-PROM each time the key is depressed.

After leaving the step with **SELECT**, the last value will be stored in the EE-PROM.

Step 61: Adjustment of stereo channel separation Stereo TDA9840

Purpose: Adjustment of channel separation of the stereo demodulator TDA9840 [7780].
Symptom if incorrectly set:
Crosstalk between left and right channel.

TP	ADJ.	MODE	INPUT
Pin 3 of Scart 1 (Audout left)	refer to description	Stop Stereo	RF - input,white picture,1kHz sound only on right channel +/-27kHz deviation
TAPE		MEAS. EQ.	SPEC.
		AC Millivoltmeter or Oszilloscope	lowest value

By pressing the SELECT key whilst step 61 is flashing, the output select is switched to stereo and the display shows, for instance:

- Connect Millivoltmeter to Scart1 Pin 3 (Audio out left).
- The noise amplitude on Scart 1 Pin 3 (Audio out left) can be adjusted to the lowest value by pressing the UP(+) or DOWN (-) keys.
  (The amplitude changes by 0.1 dB each time the key is pressed)
  The range is shown in the display with the numbers 0...49.
- The value is automatically stored in the EE-PROM each time the button is pressed.

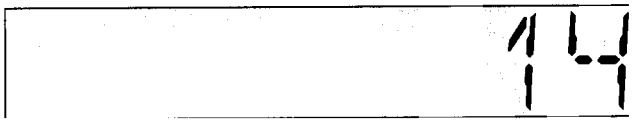
After leaving the step with SELECT, the last value remains stored in the EE-PROM.

Step 62: Adjustment of the Audio-Linear-Playback level (only for stereo units)

Purpose: Adjustment of the amplification of the audio linear playback
level TDA9604H [7850].
Symptom if incorrectly set:
The linear playback sound is too low or too loud.

TP	ADJ.	MODE	INPUT
Pin 1 of Scart 1 (Audout)	refer to description	SP Self-recording and Playback	(AUDIO IN E1) 700mV$_{RMS}$ 1kHz
TAPE		MEAS. EQ.	SPEC.
Blank Tape		AC Millivoltmeter	500mV$_{RMS}$ ±50mV

By pressing the SELECT button whilst step 62 is flashing, the output select is switched to Mono and the display shows, for instance:



- Make a recording of the audio signal on E1.
- Connect the millivoltmeter to Scart1 Pin1(Audio out) and play the recording back.
- The level on Scart 1, Pin1 (Audio out) can be adjusted to the set value by pressing the UP (value increases) or DOWN keys (value decreases).
  (The amplitude changes by 1 dB each time the key is pressed).
  The range is shown in the display by the numbers 0...15.
- The value is automatically stored in the EE-PROM each time the button is pressed.

Step 99: Clock frequency output

Purpose: Setting the exact clock function.

Symptom, if incorrectly set:
The clock is too fast or too slow.

After entering with SELECT, the display is switched off and no further function can be carried out. At the HEST measuring point [7201 pin 80], the uncorrected clock frequency of approx. 2048 Hz is always output.
Measure the output frequency with the calibrated counter (minimum resolution of 6 digits) and note down the value (f_{mess}).

Determining the deviation (in ppm):

f_{mess}.....measured frequency
f_{nom}.....set frequency (2048,000 Hz)

Deviation = $1x10^6 x (f_{mess} - f_{nom}) / f_{nom}$

Determining the correction value for Step 53:

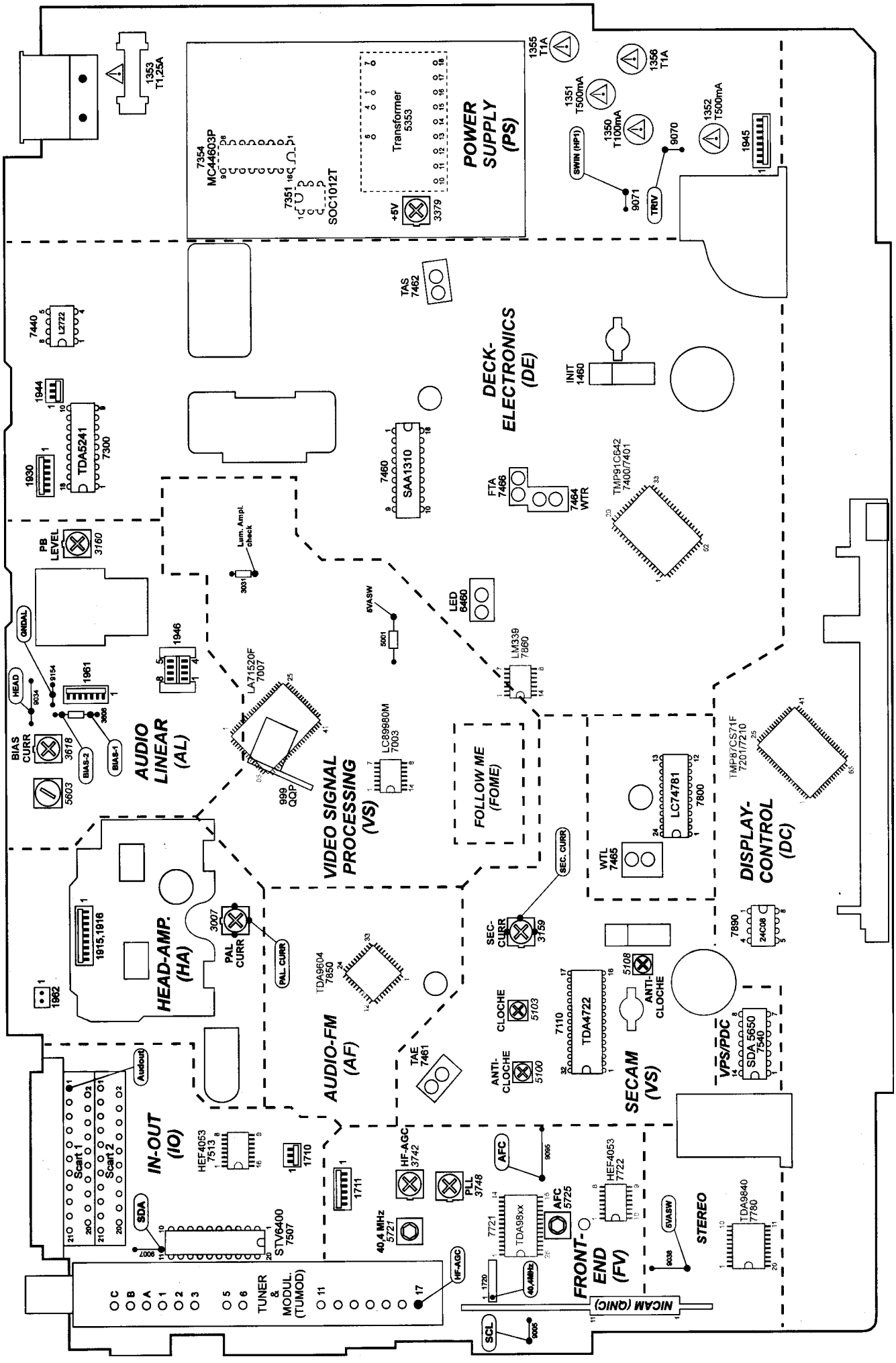
Correction value = Deviation / 0.763 + 128 (round off to whole number)

The calculated **correction value** must be between 0 and 255 (change quartz otherwise), and must be entered in Step 53 and saved.
This Step can only be left by performing a **mains reset**, after which the service program must be entered again before Step 53 can be called up.

Example:

f_{mess}=2047.97Hz f_{nom}=**2048.00Hz**

Deviation = $1x10^6 x$ (2047.97 - 2048) / 2048 = -14.648
Correction value = -14.648 / 0.763 + 128 = 108.80 = **109**

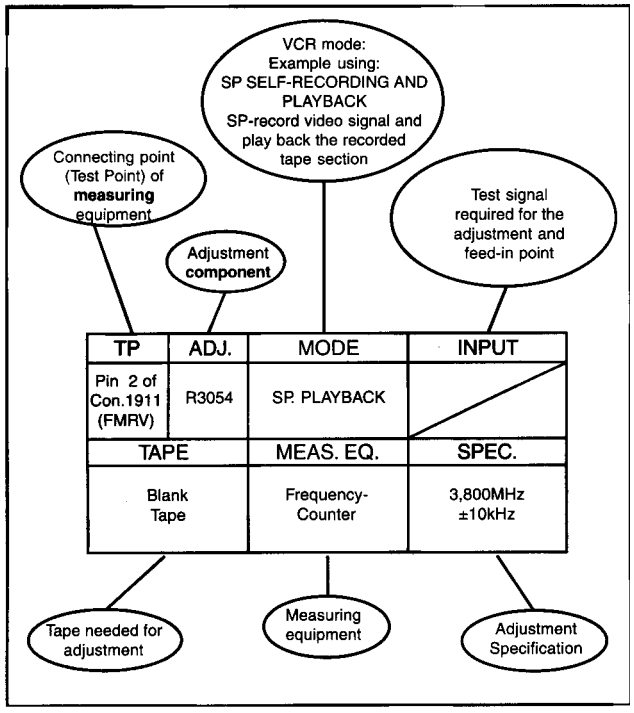

POWER SUPPLY (PS)
DECK-ELECTRONICS (DE)
AUDIO LINEAR (AL)
VIDEO SIGNAL PROCESSING (VS)
FOLLOW ME (FOME)
HEAD-AMP. (HA)
AUDIO-FM (AF)
IN-OUT (IO)
SECAM (VS)
DISPLAY-CONTROL (DC)
FRONT-END (FV)
STEREO
VPS/PDC
TUNER & MODUL. (TUMOD)
NICAM (QNIC)
Transformer 5353
SOC1012T
MC44603P
TDA5241 7300
SAA1310 7460
LA71520F 7007
LC89980M 7003
LM339 7860
TDA9604 7850
TDA4722 7110
LC74781 7800
TMP87CS71F 7201/7210
TMP91C642 7400/7401
TDA98xx 7721
TDA9840 7780
HEF4053 7513
HEF4053 7722
STV6400 7507
SDA 5650 7540
Scart 1
Scart 2
PB LEVEL 3160
BIAS CURR 5603
PAL CURR 3007
SEC-CURR 3159
CLOCHE 5103
ANTI-CLOCHE 5100
ANTI-CLOCHE 5108
HF-AGC 3742
PLL 3748
AFC 5725
40.4 MHz 5721
INIT 1460
TAS 7462
FTA 7466
7464 WTR
WTL 7465
TAE 7461
LED 6460
Lum. Ampl. check 3051
999 QQP
1353 T1,25A
1355 T1A
1356 T1A
1351 T500mA
1350 T100mA
1352 T500mA
9070
9071
SWIN (HP1)
TRIV
+5V 3379
6VASW
QNDAL
HEAD
BIAS-2
BIAS-1
SDA
SCL
HF-AGC
40.4MHz
Audout

ADJUSTMENT INSTRUCTIONS

Test equipment:

1. Dual-trace oscilloscope
   Voltage range : 0.001 ~ 50 V/div
   Frequency : DC ~ 50 MHz
   Probe : 10:1, 1:1
2. DVM (Digital voltmeter)
3. Frequency counter
4. Sinus generator
   Sinus 0 ~ 50 MHz
5. Test pattern generator
6. VHS Alignment Tape 4822 397 30103

How to read the adjustment procedures:



1. Power supply - QMB (PS)

Service tasks after repairing the power supply

1.1 Setting the output voltage +5VASW [3379]:

Purpose: To set the correct supply voltage.

Symptom, if incorrectly set:
VCR functions are not operating correctly.

TP	ADJ.	MODE	INPUT
wire +5VASW	R3379	Playback	
TAPE		MEAS. EQ.	SPEC.
Any tape		DC Voltmeter	5,3V ±0.03V

2. Video signal processing-QMB (VS,AL,I/O)

Service tasks after replacement of ICs 7007, 7110:

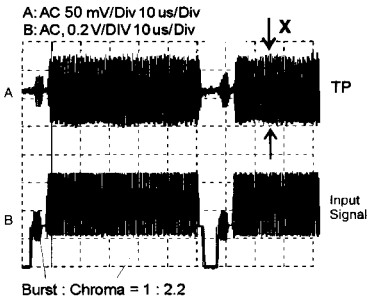
Purpose: To set the optimum record PAL or SECAM chroma level.
Symptom, if incorrectly set:
If the record level is too high, beats may appear on the picture. If the level is too low, the colour may be de-graded.
Before commencing adjustment:
Call the service test program and enter Step 10 (Dummy mode). Remove the drive from the motherboard.
Control the luminace amplitude on TP R3031:

TP	ADJ.	MODE	INPUT
Pos. R3031 (emitter side)		Dummy mode Record Preset E1	(VIDEO IN E1) Red Picture PAL 75% Saturation
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Oscilloscope Video Pattern Generator	420 mV_{pp} ± 40 mV_{pp}

2.1 PAL chrominance record current adjustment [3007]:

Connect resistor R3031 on the emitter side (T7006) with 5VASW of coil L5001.

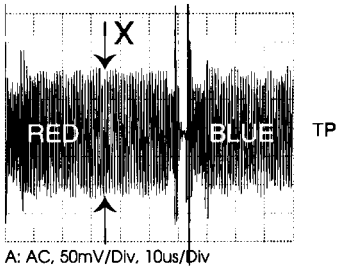
TP	ADJ.	MODE	INPUT
Pos. R3007 (slider)	R3007	Dummy mode Record Preset E1	(VIDEO IN E1) Red Picture PAL 75% Saturation
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Oscilloscope Video Pattern Generator	**X**=160 ± 20 mV_{pp}, for 2 heads VCR **X**=130 ± 20 mV_{pp}, for 4 heads VCR



2.2 SECAM chrominance record current adjustment [3159]:

Connect resistor R3031 on the emitter side (T7006) with 5VASW of coil L5001.

TP	ADJ.	MODE	INPUT
Pos. R3159 (slider)	R3159	Dummy mode Record of Preset E1	(VIDEO IN E1) Red Picture SECAM 75% Saturation
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Oscilloscope Video Pattern Generator	**X**=210 ± 30 mV_{pp}, measured in red line



3. Audio linear - QMB (VS, AL, I/O)

Service tasks after replacement of coil L5603, IC7007 or the audio heads:

3.1 Adjusting the erasing frequency [5603]

Purpose: To set the correct recording erasing frequency.

Symptom, if incorrectly set:
Erasing frequency or its harmonics cause audio faults.

TP	ADJ.	MODE	INPUT
wire 9034 (HEAD)	L5603	Set tuned to channel 27 Record	PAL white picture, audio IF and modulation on
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Frequency Counter	70kHz ±10kHz

3.2 Adjustment of playback amplitude [3160]: (mono only)

Purpose: To set audio part amplification

Symptom, if incorrectly set:
Playback sounds too faint or too loud

TP	ADJ.	MODE	INPUT
Pin 1 of Scart 1 (Audout)	R3160	SP Self-recording and Playback	(Video white picture) Audio in Scart 1, 700mV_{RMS}, 1kHz
TAPE		MEAS. EQ.	SPEC.
Blank Tape		AC Millivoltmeter, Video Pattern Generator	500mV_{RMS} ±50mV

3.3 Adjustment of bias current [3618]:

Purpose: To set the optimum record bias current.

Symptom, if incorrectly set:
If the audio level is too high, the higher frequencies of the linear sound are too low.
If the level is too low, the higher frequencies are too strong and sound distortions inrease.

TP	ADJ.	MODE	INPUT
R3606 (difference measurement BIAS1 - BIAS2)	R3618	Set tuned to channel 27 Record	PAL white picture, audio IF and modulation on
TAPE		MEAS. EQ.	SPEC.
Blank Tape		AC Millivolmeter	15mV_{RMS} ±1mV_{RMS} (70kHz)

Checking the 'bias' adjustment:

After the bias has been adjusted to the indicated level, record some music, play back the recording, and adjust the audio switch to "MONO".
Only use brand name cassettes, but not chrome dioxide tapes.
Check if sufficient treble is reproduced and for any audio distortion. In case of insufficient treble, reduce 'bias' current a little. In case of excessive distortion, increase 'bias' current a little.

4. Front End - QMB (VS, AL, I/O)

Service tasks after replacement of ICs 7720, 7721, coil L5725 and TUMOD:

4.1 AFC Adjustment:

Purpose: Correct adjustment of demodulator AFC - circuit

Symptom, if incorrectly set:
Bad or disturbed TV channel reception.

4.1.1 PAL - AFC adjustment [5725]:

TP	ADJ.	MODE	INPUT
IC 7720 Pin 15	L5725	E to E	38,9MHz 500mV_{pp} at Tuner 1701 Pin 17
TAPE		MEAS. EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2,5V ±0,2V

4.1.2 PAL/SECAM - AFC adjustment [5725]

TP	ADJ.	MODE	INPUT
IC 7721 Pin 20	L5725	E to E	38,9MHz 500mV_{pp} at Tuner 1701 Pin 17
TAPE		MEAS. EQ.	SPEC.
		DC Voltmeter Frequ. Generator	2,5V ±0,2V

4.2 SECAM band 1 - AFC adjustment [3748] (SECAM L / L' only)

Before commencing adjustment.

— Switch VCR to SECAM with SYSTEM key.

TP	ADJ.	MODE	INPUT
IC 7721 Pin 20	R3748	E to E, SECAM L' tuned on this preset	33,9MHz 500mV_{pp} at Tuner 1701 Pin 17
TAPE		MEAS. EQ.	SPEC.
		DC Voltmeter Freq. Generator	2,5V ±0,2V

4.3 Phase offset adjustment [3743]: (TDA9800T only)

After replacement of the IC TDA9800T [7720], the potentiometer pos. 3748 has to be removed from the motherboard. The demodulator IC TDA9800T [7720] is automatically adjusted to a default value.

4.4 HF - AGC adjustment [3742]:

Service tasks after replacement of ICs 7720, 7721 or TUMOD:

Purpose: Set amplifier control.

Symptom, if incorrectly set:
Picture jitter if input level is too low and picture distortion if input level is too high.

TP	ADJ.	MODE	INPUT
Tuner 1701 Pin 17	R3742	Set tuned to channel 27	4,5mV(74dBµV) on aerial input PAL white picture, audio IF on, no modulation
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope Video Pattern Generator	550mV$_{pp}$ +/-50mV (use a 10:1 probe)

4.5 Attenuating the 40.4 MHz [5721]: (SECAM only)

Service tasks after replacement of coil 75721

Purpose: To attenuate the band I carrier rests.

Symptom, if incorrectly set:
Bad picture quality when the filter attenuates the picture carrier (38.9MHz).

TP	ADJ.	MODE	INPUT
OFW 1720 Pin 1	L5721	E to E	40.4 MHz, 300mV$_{rms}$ at Tuner 1701 Pin 17
TAPE		MEAS. EQ.	SPEC.
		Oscilloscope, Sinus Generator, Counter	adjust minimum amplitude

If the adjustment is correct the signal at pin 1 of SFW [1720] must be smaller than the input signal amplitude by at least 5 dB.

Software adjustments in the service test program

5. Deck electronics - QMB (DE, DC)

Service tasks after replacement of the head drum or EEPROM:

5.1 Software adjustment of gap positions:

Information about this adjustment is contained in the Fault Locating document, Chapter 2-20, and in the service test program in Step 51.

5.2 "Studio Picture control" adjustment:

Information about this adjustment is contained in the Fault Locating document, Chapter 2-20, and in the service test program in Step 52.

6. Stereo demodulator TDA9840 - QMB (FV)

Service tasks after replacement of IC7780 or the EEPROM:

6.1 Stereo level adjustment [7780]:

Information about this adjustment is contained in the Fault Locating document, Chapter 2-20, in the service test program in Step 60.

6.2 Stereo channel separation adjustment [7780]:

Information about this adjustment is contained in the Fault Locating document, Chapter 2-20, in the service test program in Step 61.

7. Audio HIFI TDA9604H - QMB (AF)

Service tasks after replacement of the audio heads, IC 7007 or the EEPROM:

7.1 Audio Linear playback level adjustment TDA9604H [7850]:

Information about this adjustment is contained in the Fault Locating document, Chapter 2-20, in the service test program in Step 62.

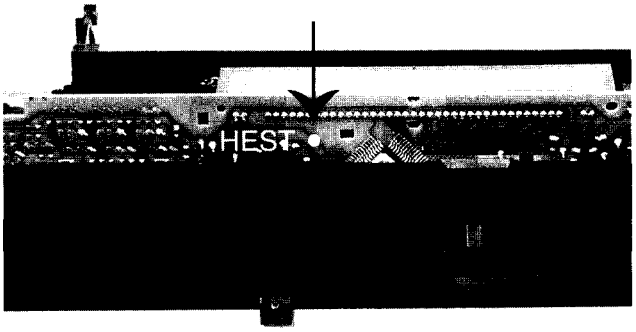
8. Display Control - QMB (DE, DC)

Service tasks after replacement of the clock quartz [1297] or the EEPROM:

8.1 Clock frequency adjustment:

The clock is corrected via software with the measurement of a frequency at the HEST measuring point [7201, pin 80] and computation of a correction factor.

Information about this adjustment is contained in the Fault Locating document, Chapter 2-20, in the service test program in Steps 53 and Step 99.



List of abbreviations

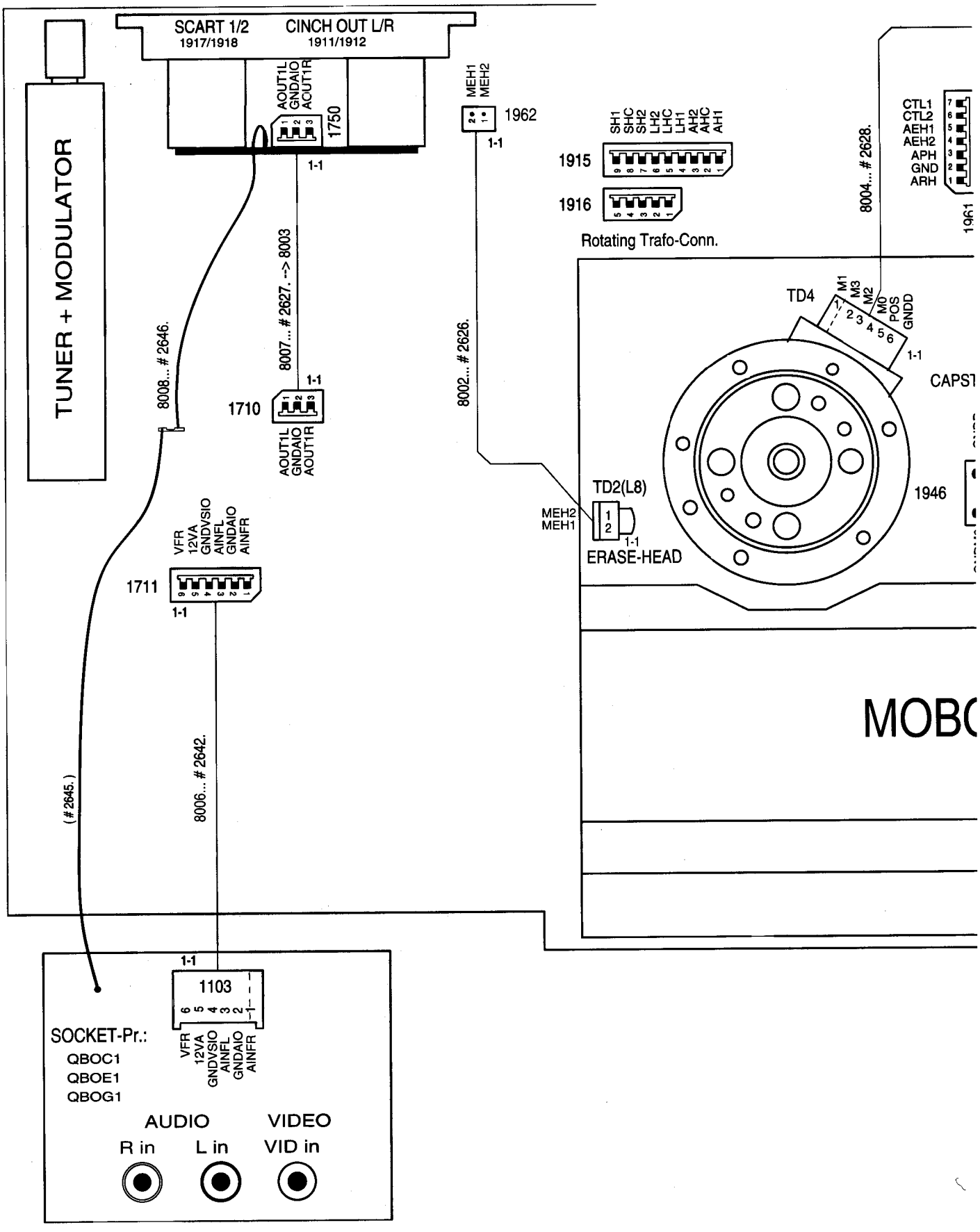
Signal	Description	Application										
+5AS	+5V analog after fuse 1700											QNIC
+5ASS	+5V digital, after coil 5706											QNIC
+5D	+5V digital			DE								QNIC
-28V	-28V display supply	PS			DC			IO				
-7V	-7V I/O-switches supply							IO				
12SW	+12V analog (< 6W switched)	PS					AL			FV			QNIC
12VA	+12V analog	PS						IO		FV	AF		
14VM1	+14V for threading- and headmotor	PS		DE									
2FSC	2x Colour subcarrier					VS						OS	
33V	+33V for tuner tuning voltage	PS								FV			
5VA	+5V analog	PS						IO		FV	AF	OS	
5VASW	+5V analog (< 6W switched)	PS	HA	DE		VS			SE	FV		OS	QNIC
5VASW2	+5V analog after coil 5802											OS	
5VASWB	+5V analog after coil 5726									FV			
5VD	+5V digital	PS		DE	DC					FV			
5VD1	+5V digital, after coil 5200				DC								
5VD2	+5V digital, after coil 5400			DE									
8SC1	Scart 1 pin 8 output			DE				IO					
8SC2	Scart 2 pin 8 input			DE				IO					
9/14VM2	Capstan motor supply, switched	PS		DE									
AEH1/2	Audio erase head						AL						
AF1	Audio from frontend, left						AL	IO		FV	AF		
AF2	Audio from frontend, right									FV	AF		
AFC	Automatic frequency control				DC					FV			
AFE	Audio from frontend									FV			QNIC
AGC	Automatic gain control			DE						FV			
AH1/2/C	Audio heads		HA										
AIN1	Audio input scart 1						AL	IO					
AIN1L	Audio input scart 1, left							IO			AF		
AIN1R	Audio input scart 1, right							IO			AF		
AIN2	Audio input scart 2						AL	IO					
AIN2L	Audio input scart 2, left							IO			AF		
AIN2R	Audio input scart 2, right							IO			AF		
AINFL	Audio left from Front connector							IO			AF		
AINFR	Audio right from front connector							IO			AF		
AMCO	Audio to the modulator									FV	AF		
AMLP	Audio mono playback						AL	IO		FV	AF		
AMLR	Audio mono record						AL	IO			AF		
AN1/2	Analog voltage from keyboard matrix				DC								
ANIL	NICAM Audio, left									FV			QNIC
ANIR	NICAM Audio, right									FV			QNIC
AOUT1L	Audio output from scart 1, left							IO			AF		
AOUT1R	Audio output from scart 1, right							IO			AF		
AOUT2L	Audio output from scart 2, left							IO			AF		
AOUT2R	Audio output from scart 2, right							IO			AF		
APH	Audio playback head						AL						
ARH	Audio record head						AL						
BLANKING	Blanking pulse RGB loopthrough							IO					
BLUE	Blue signal between scart 1/2							IO					
CAP	Capstan control voltage			DE									
CKDET	Colour system information			DE		VS							
CLKD1	Serial bus clock			DE	DC								
CREV	Capstan reverse			DE									
CROT	Colour rotation on/off			DE		VS							

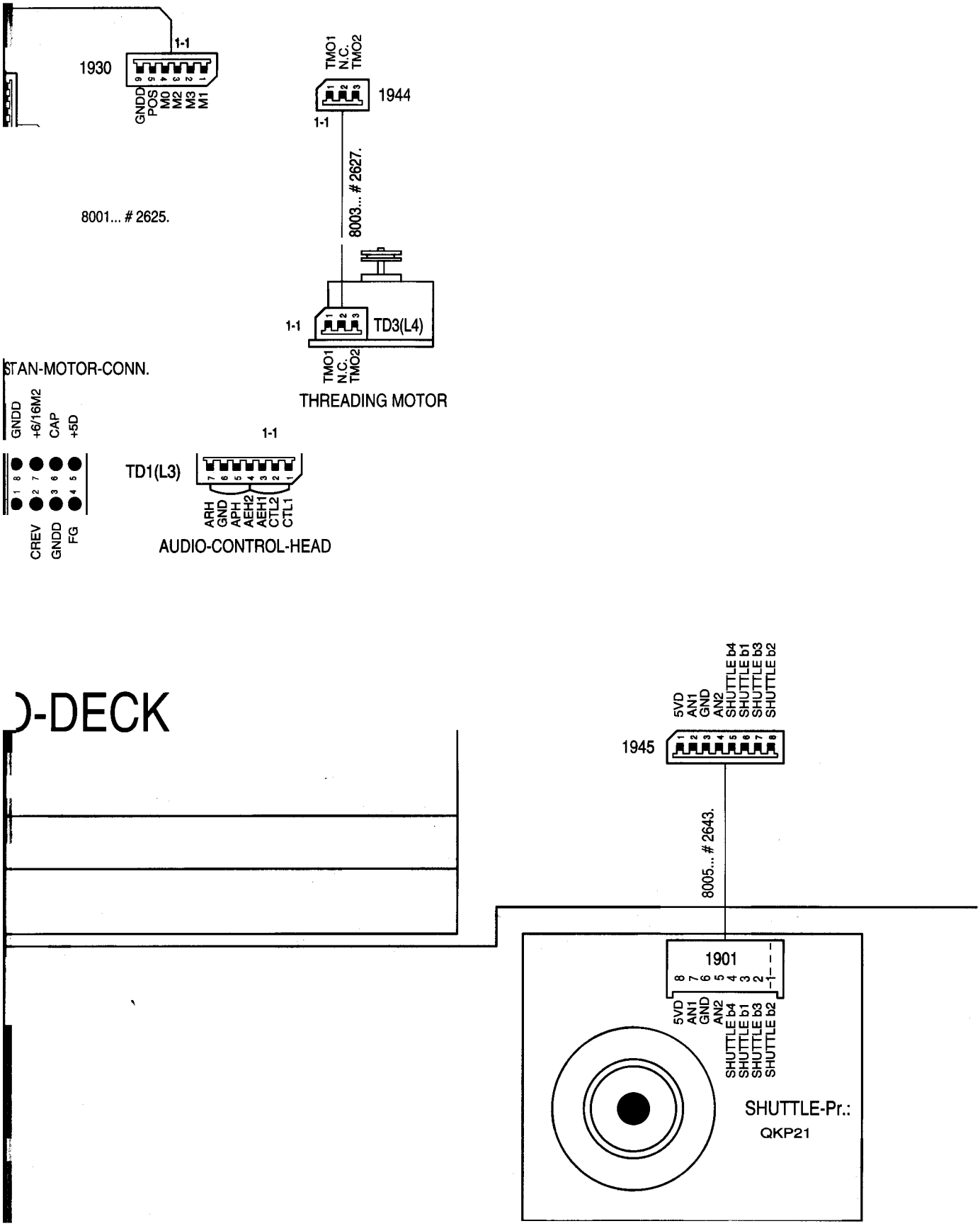
Signal	Description	Application											
CSCP	Colour phase switching for LP feature mode			DE		VS							
CSI	Colour system information			DE					SE				
CSP	Chrominance secam playback					VS			SE				
CSR	Chrominance secam record		HA						SE				
CSW	8V/14V switching for capstan motor	PS		DE									
CSYNC/1/2	Composite sync pulse		HA	DE		VS			SE			OS	
CTL1/2	Control track signal			DE			AL						
DATD1/2	Serial bus data			DE	DC								
DEC	Audio switching voltage							IO					
ENVC	Envelope comparator signal		HA	DE									
FFP	Feature frame pulse			DE		VS							
FG	Capstan tacho pulse			DE									
FGD	Capstan tacho pulse digital			DE									
FMAP	FM audio playback		HA								AF		
FMAR	FM audio record		HA								AF		
FMPV	FM video playback		HA			VS			SE				
FMRV	FM video record		HA			VS							
FOME	Follow Me (video signals equal)			DE								OS	
FTA	Threading tacho			DE									
FTAD	Threading tacho digital			DE									
GNDA	Ground analog							IO		FV			QNIC
GNDA1/A2	Ground analog QNIC												QNIC
GNDAF	Ground analog AF										AF		
GNDAIO	Ground analog IO							IO					
GNDAL	Ground analog AL						AL						
GNDD	Ground digital			DE				IO			AF		QNIC
GNDEO	Ground erase oscillator						AL						
GNDM	Ground capstan motor			DE									
GNDVS	Ground signal electronics										AF		
GNDVSIO	Ground analog VS, IO							IO					
GREEN	Green signal between scart1/2							IO					
HEHI	Heater for displaytube high	PS			DC								
HELO	Heater for displaytube low	PS			DC								
HEST	Heater voltage control signal				DC								
HP2	Head pulse audio		HA	DE							AF		
I/R	Deck switch / Record protection			DE									
ILED	LED-tower supply			DE									
INIT	Deck switch			DE									
IPOR	Inverse power on reset			DE	DC								
IRAF	Inverse record FM-audio		HA	DE									
IREV	Dubbing oscillator on/off			DE		VS	AL						
ISTBY	Inverse stand by	PS			DC								
ISWS	Video-FM mute			DE		VS							
IWIND	Control pulse amplification low			DE									
LH1/2/C	Long play heads		HA										
MEH1/2	Main erase head						AL						
MON	Monitor loop through scart 1/2							IO					
MOT0-3	Head motor Control lines			DE									
MTA	Audio mute			DE			AL						
NC	Not connected			DE									
OCLK	OSD-bus clock				DC							OS	
OCS	OSD chip select				DC							OS	
ODAT	OSD-bus data				DC							OS	
OFP	Frame pulse			DE								OS	

Signal	Description	Application											
PBV	Playback			DE				SE					
PG/FG	Head wheel position/-speed			DE									
POS	Position pulse headwheel			DE									
PSS	PAL or secam-L				DC				FV				
RECP	Record protection			DE									
RED	Red signal between scart 1/2							IO					
REEL	Head wheel control			DE									
SB1	Secam band 1				DC				FV				
SCL	IIC bus clock							IO		FV	AF	OS	QNIC
SCL2	Serial bus clock			DE		VS							
SDA	IIC bus data							IO		FV	AF	OS	QNIC
SDA2	Serial bus data			DE		VS							
SFS	Sound filter switch				DC				FV				
SH1/2/C	Standard play heads		HA										
SSIF	Second sound interfrequency								FV				QNIC
SWIN	Head switching pulse		HA	DE									
SYNC	Control track pulse			DE									
TAE	Tape end detection			DE									
TAS	Tape start detection			DE									
THIO	Threading motor in/out			DE									
TMO	Threading motor on/off			DE									
TMO1/2	Threading motor connection			DE									
TRIA/ALI	Tracking information audio / Audio level indication			DE							AF		
TRIV	Tracking information video		HA	DE									
VBS	Video input					VS		IO				OS	
VFR	Video from front connector							IO					
VFV	Video from frontend					VS		IO		FV		OS	
VIN1	Video input scart 1							IO					
VIN2	Video input scart 2							IO					
VISS	Control sync pulse inversion			DE									
VMOD	Video to the modulator							IO		FV			
VOUT	Video from OSD part							IO				OS	
VREC	Video record from I/O					VS			SE			OS	
VREF	Reference voltage								SE				
VSB	Video from signal electronics					VS						OS	
W/R	Control track write/read			DE									
WTL	Wind tacho left			DE									
WTLD	Wind tacho left digital			DE									
WTR	Wind tacho right			DE									
WTRD	Wind tacho right digital			DE									

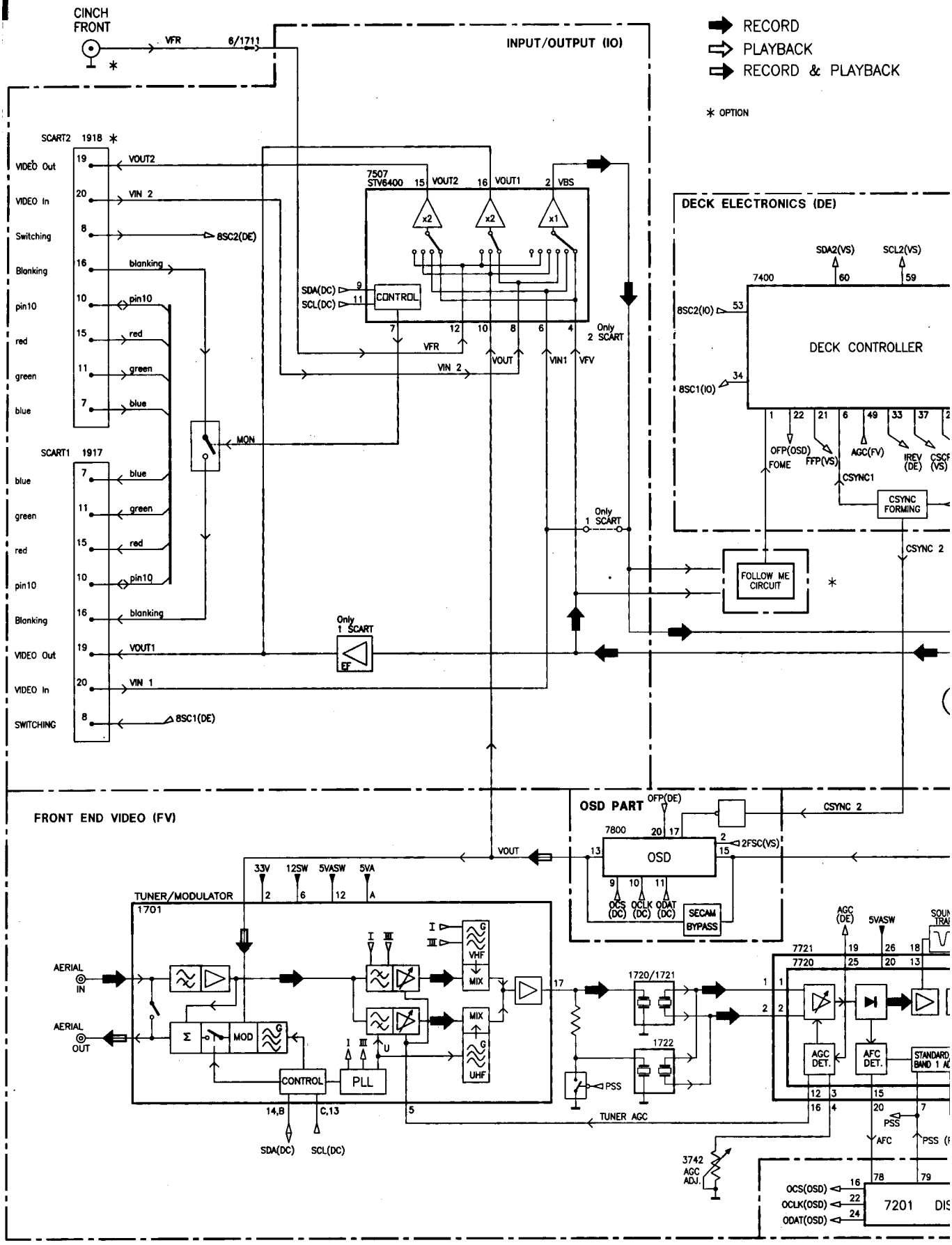
PS ..... Power Supply ..... page 3-33
HA ..... Head Amplifier ..... page 3-15
DE ..... Deck Electronics ..... page 3-16
DC ..... Display Control ..... page 3-17
VS ..... Video Signal Processing ..... page 3-18
AL ..... Audio Linear ..... page 3-18
IO ..... In/Out ..... page 3-19
SE ..... Secam Processing ..... page 3-20
FV ..... Frontend ..... page 3-21
AF ..... Audio Processing ..... page 3-22
OS ..... On Screen Display ..... page 3-23
QNIC ... Nicam Board ..... page 3-25

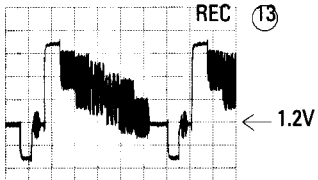
Wiring Diagram



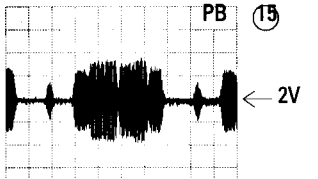

1-1
1930
GNDD
POS
M0
M2
M3
M1
8001... # 2625.
TMO1
N.C.
TMO2
1944
1-1
8003... # 2627.
1-1
TD3(L4)
TMO1
N.C.
TMO2
THREADING MOTOR
STAN-MOTOR-CONN.
GNDD
+6/16M2
CAP
+5D
CREV
GNDD
FG
1-1
TD1(L3)
ARH
GND
APH
AEH2
AEH1
CTL2
CTL1
AUDIO-CONTROL-HEAD
-DECK
5VD
AN1
GND
AN2
SHUTTLE b4
SHUTTLE b1
SHUTTLE b3
SHUTTLE b2
1945
8005... # 2643.
1901
SHUTTLE-Pr.:
QKP21

Block Diagram Video

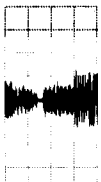




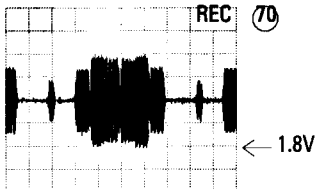
A: AC, 200mV/Div, 10us/Div
IC 7540 Pin 13



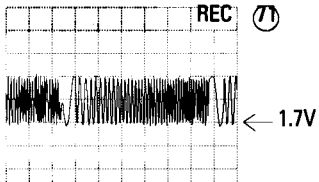
A: AC, 100mV/Div, 10us/Div
IC 7007 Pin 46 (PAL)



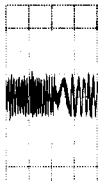
A: AC, 100
IC 7007 Pi



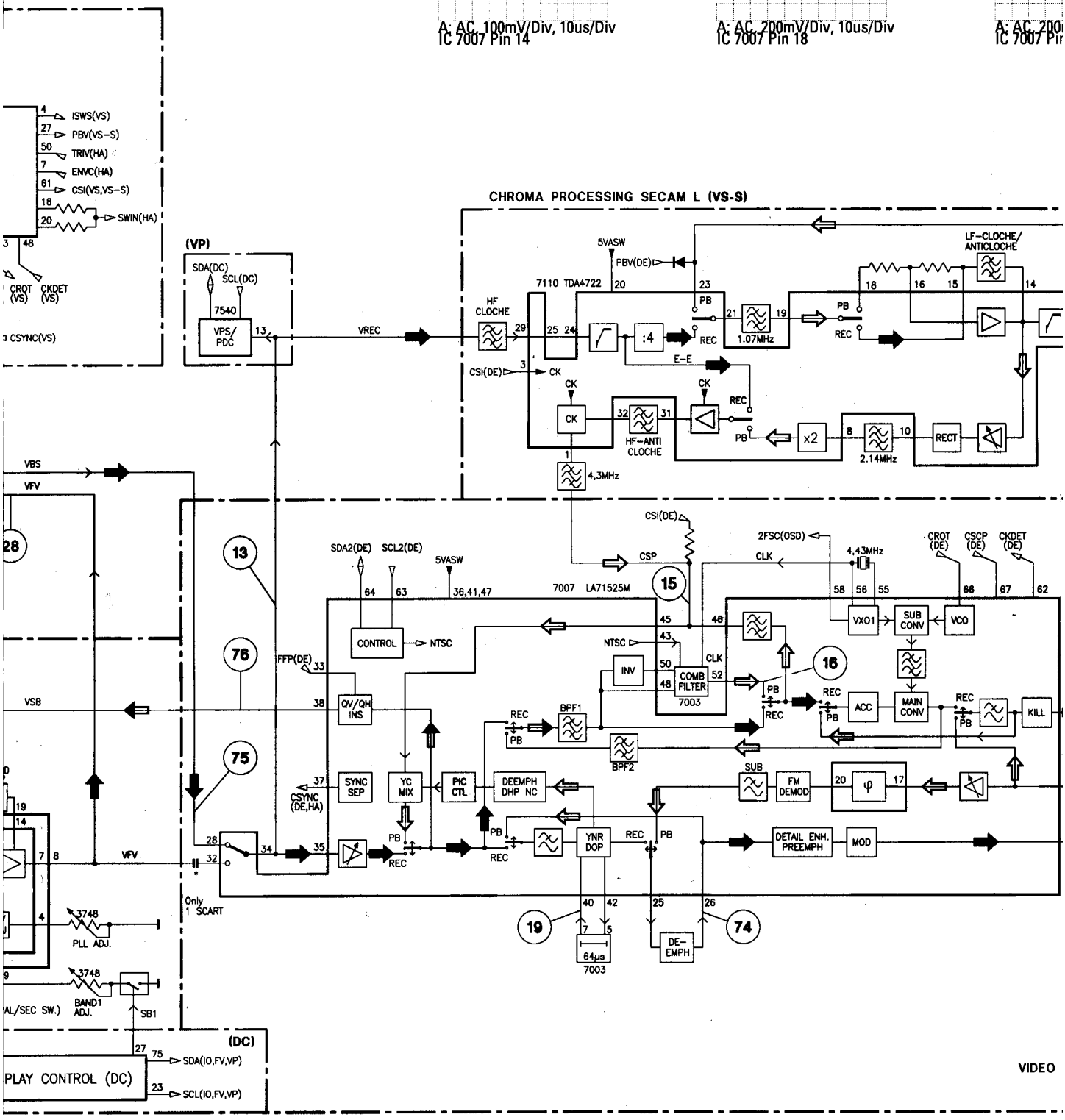
A: AC, 100mV/Div, 10us/Div
IC 7007 Pin 14

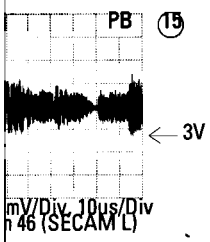


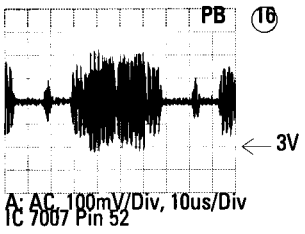
A: AC, 200mV/Div, 10us/Div
IC 7007 Pin 18

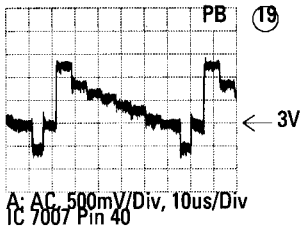


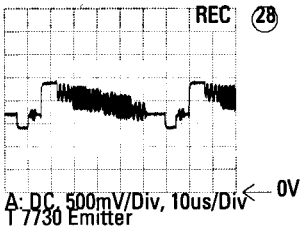
A: AC, 200
IC 7007 Pi

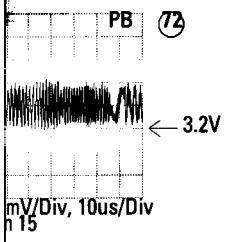


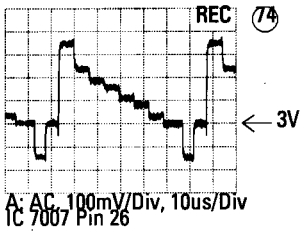


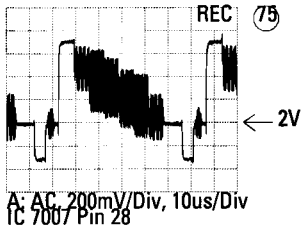


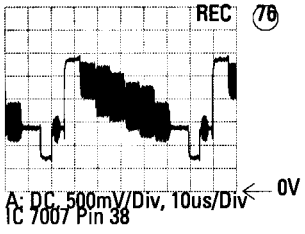












Interconnections:

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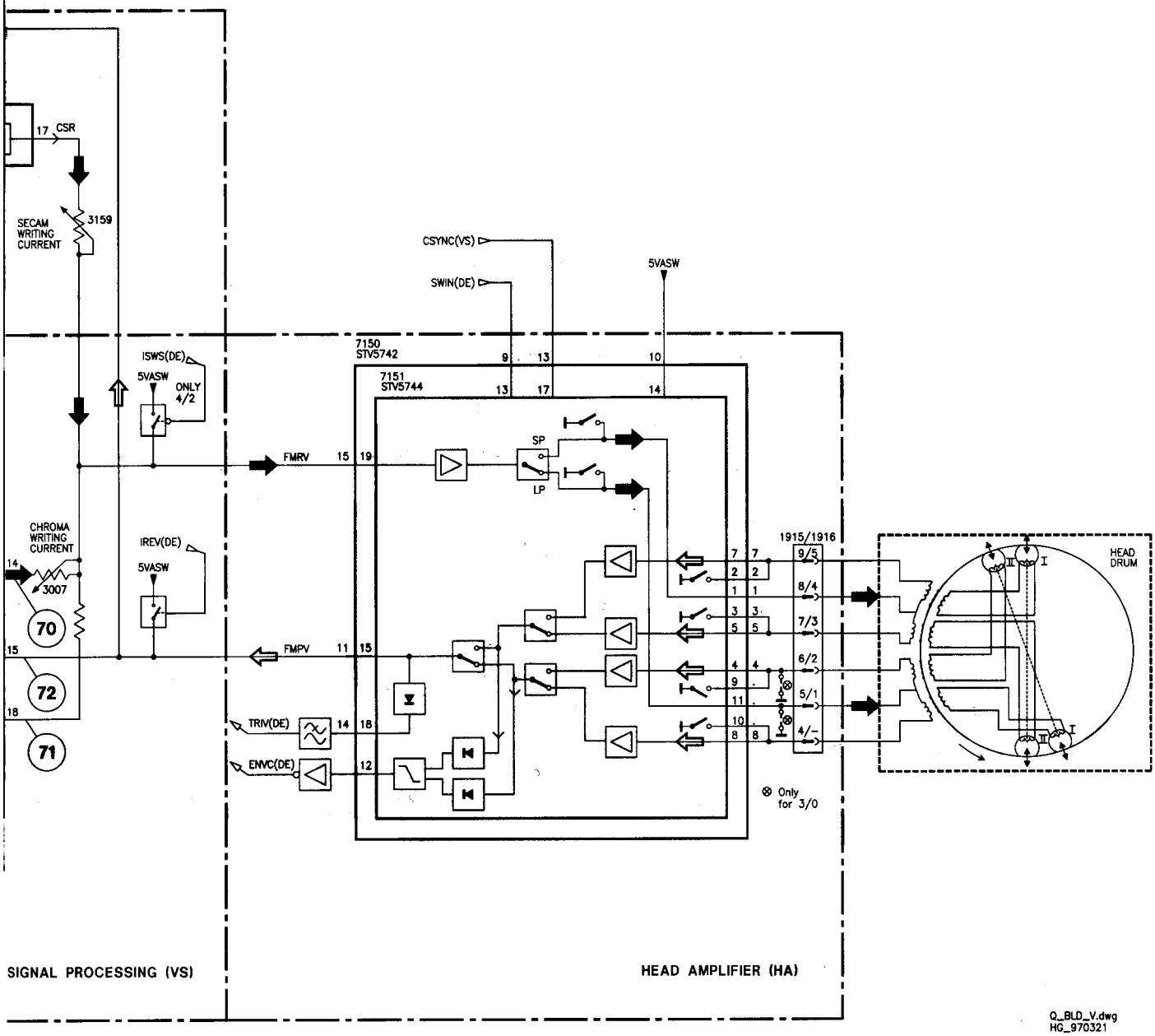
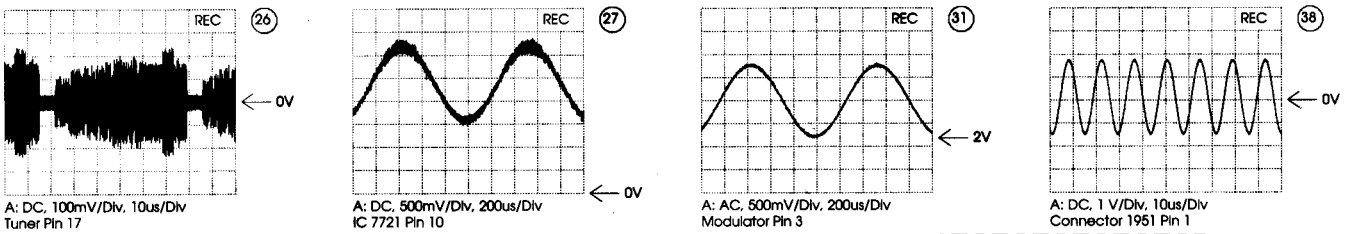
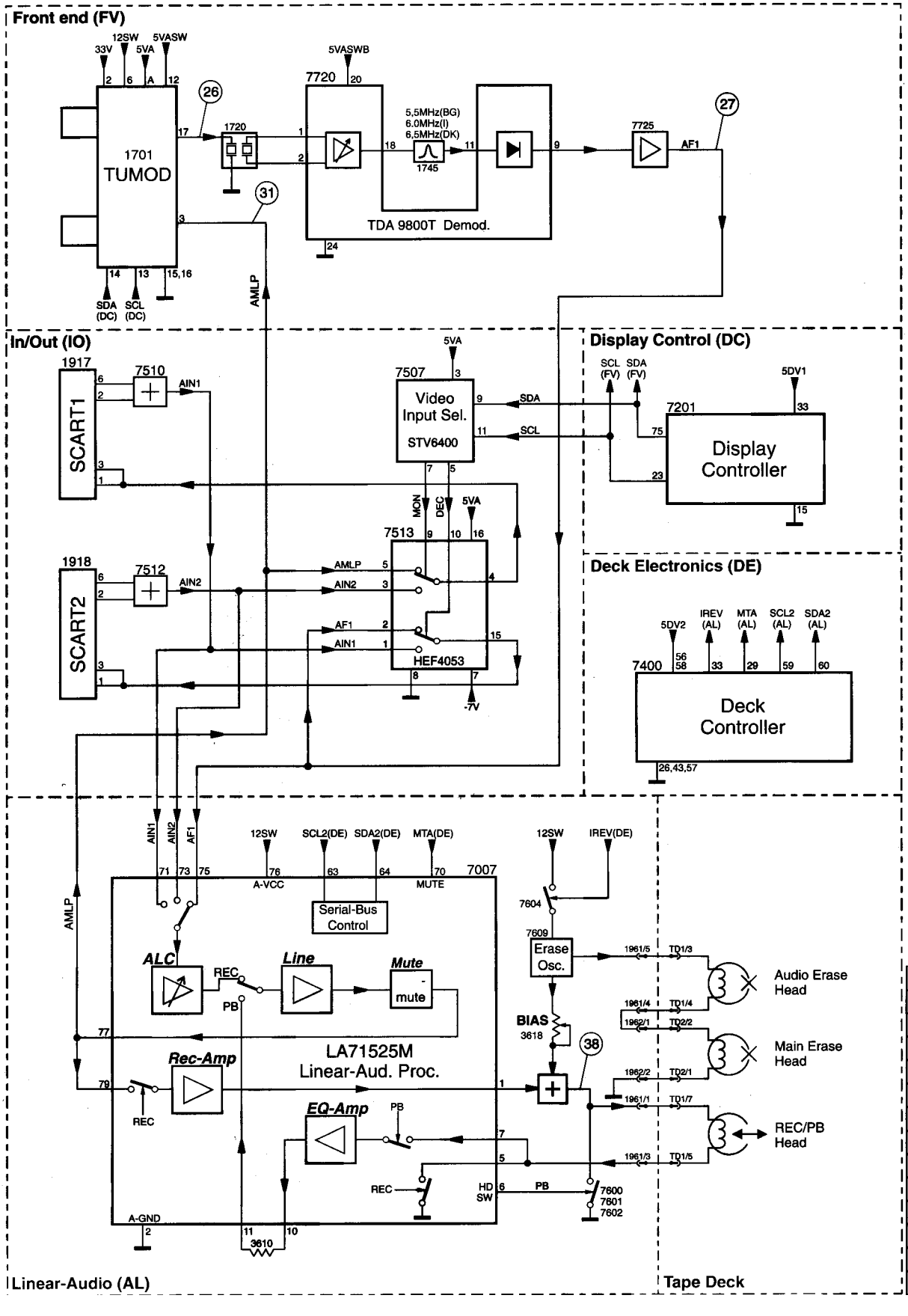
IO page 3-19	OS page 3-23	PS page 3-14	QNIC page 3-25	VP/PD page 3-23	VS page 3-18	VS_S page 3-20



Q_BLD_V.dwg
HG_970321

Block Diagram Audio Mono





Interconnections:

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AL page 3-18
DC page 3-17
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FV page 3-21
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OS page 3-23
PS page 3-14
QNIC page 3-25
VP/PD page 3-23
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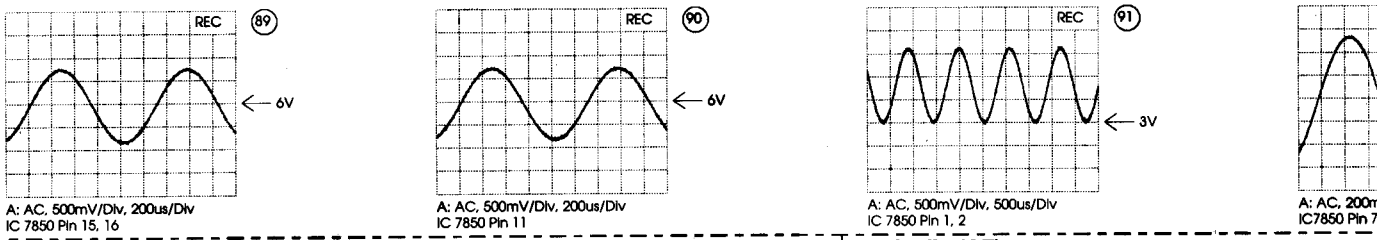
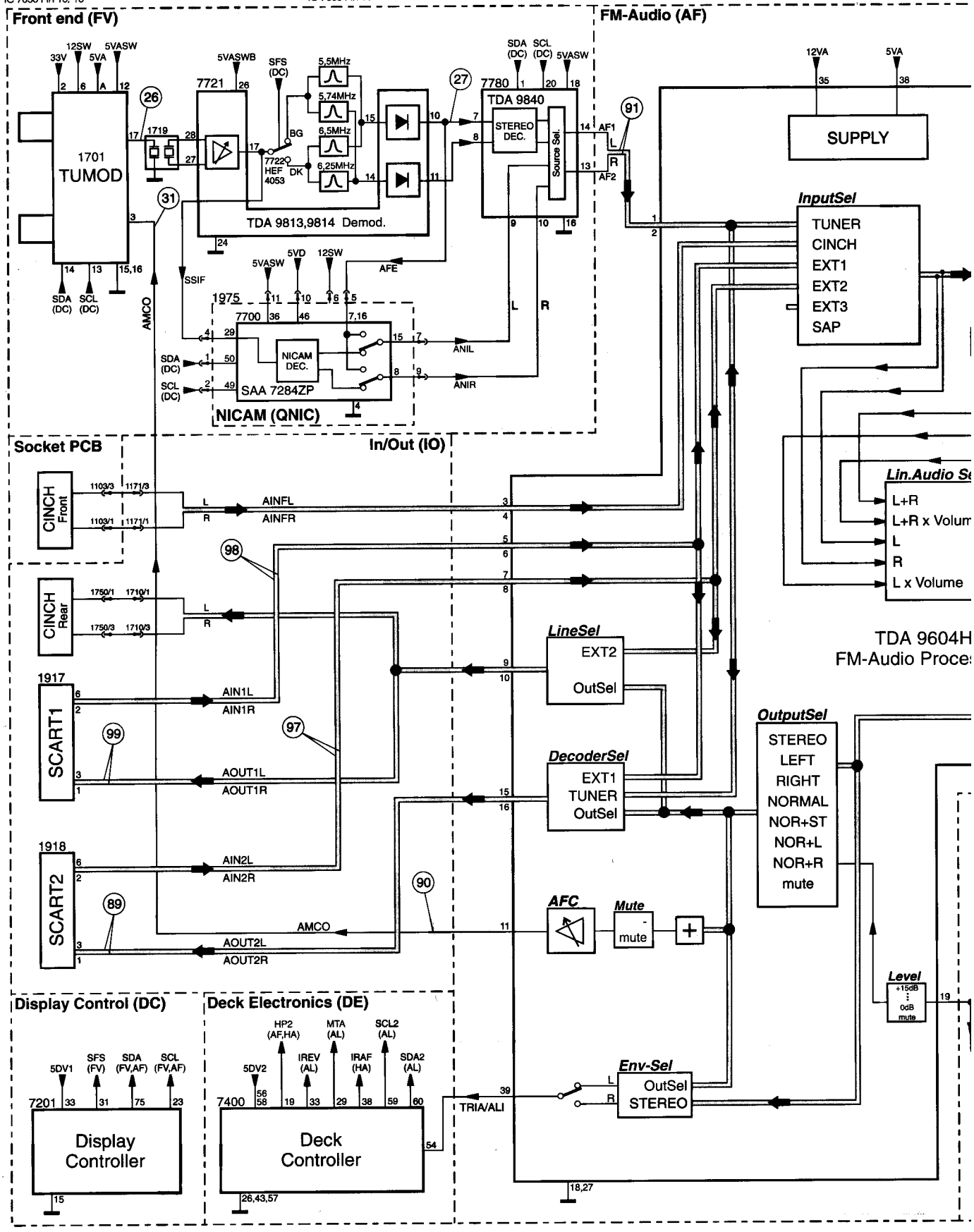
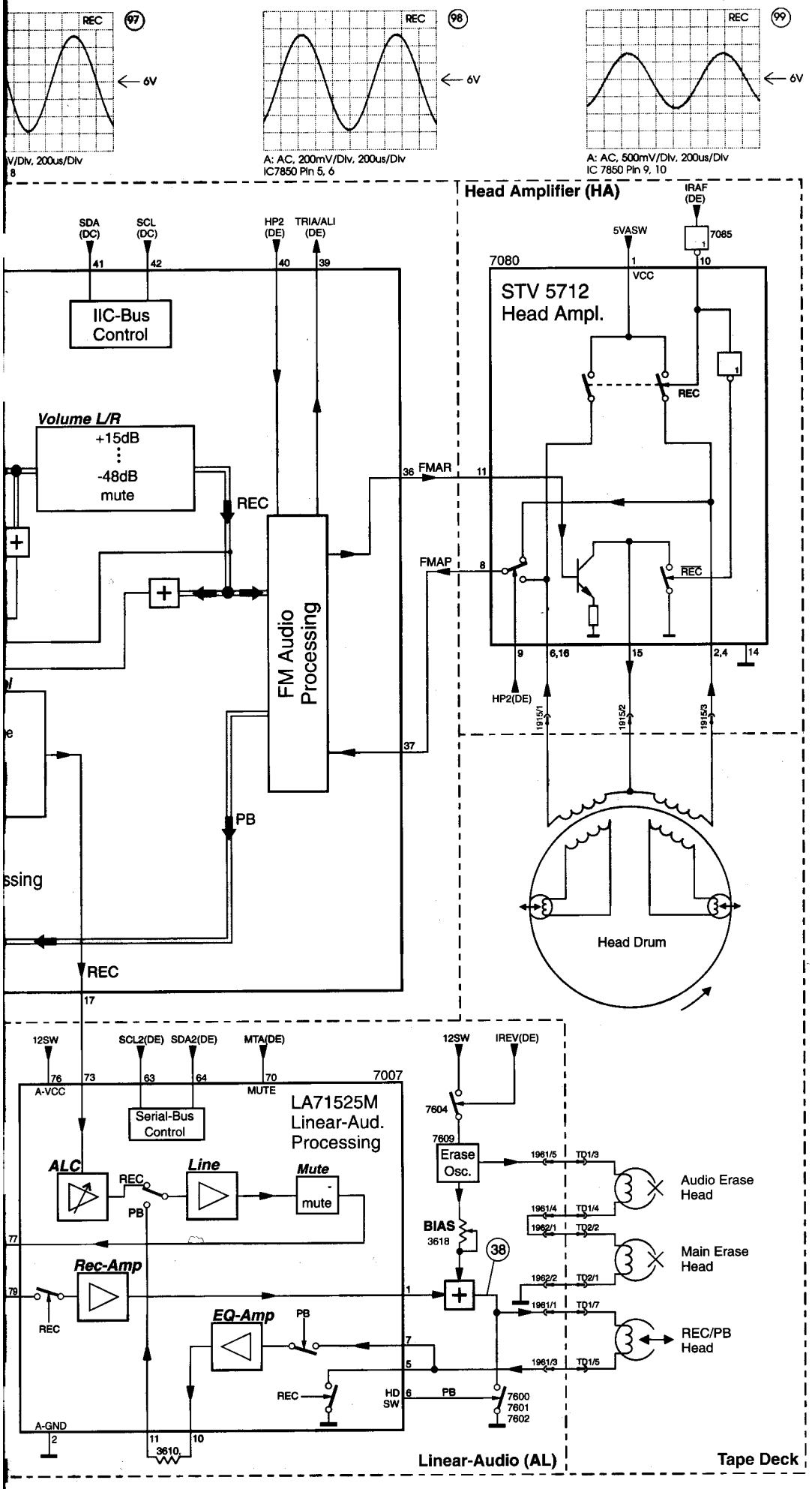
VS_S page 3-20

Block Diagram Audio Stereo







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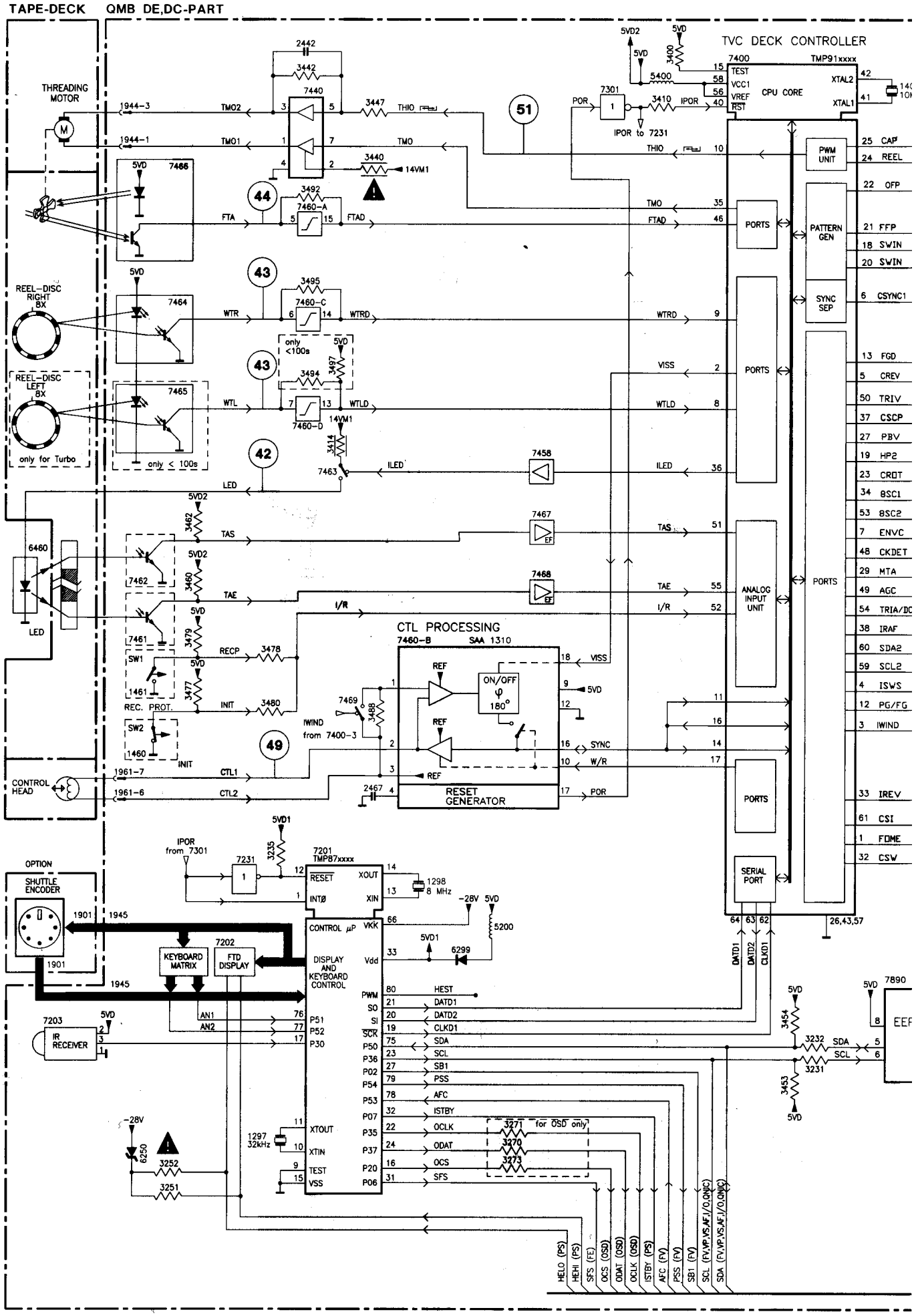
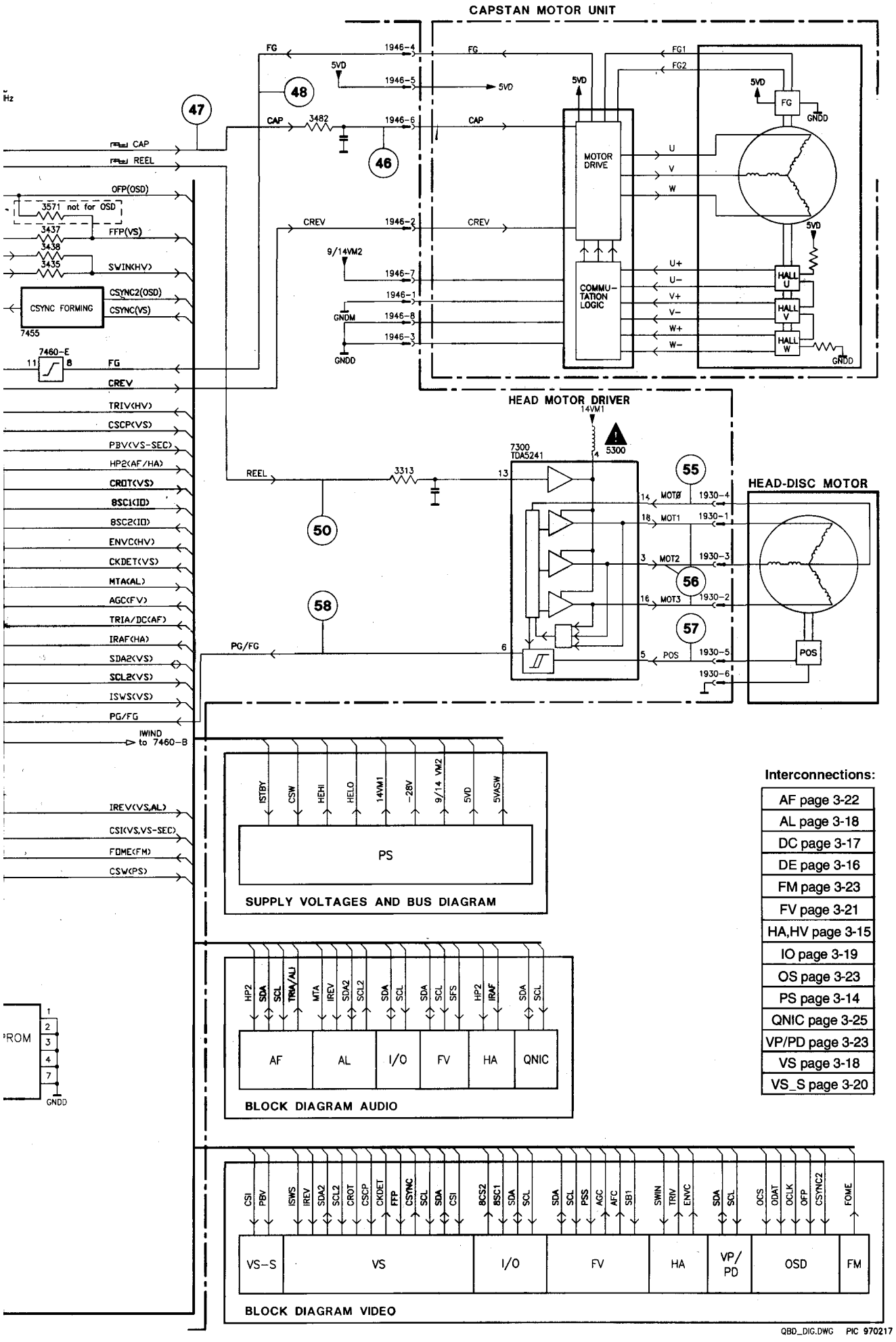
PCS 77287

Block Diagram Digital




CAPSTAN MOTOR UNIT
FG
1946-4
5VD
1946-5
48
47
CAP
3482
1946-6
46
CAP
REEL
OFP(OSD)
3571 not for OSD
3437
FFP(VS)
3438
3435
SWIN(HV)
CSYNC FORMING
CSYNC2(OSD)
CSYNC(VS)
7455
7460-E
11
8
FG
CREV
TRIV(HV)
CSCP(VS)
PBV(VS-SEC)
HP2(AF/HA)
CROT(VS)
BSC1(IO)
BSC2(IO)
ENVC(HV)
CKDET(VS)
MTA(AL)
AGC(FV)
TRIA/DC(AF)
IRAF(HA)
SDA2(VS)
SCL2(VS)
ISWS(VS)
PG/FG
IWIND
to 7460-B
IREV(VS,AL)
CSI(VS,VS-SEC)
FOME(FM)
CSW(PS)
CREV
1946-2
9/14VM2
1946-7
1946-1
GNDM
1946-8
1946-3
GNDD
MOTOR DRIVE
COMMU-TATION LOGIC
U
V
W
U+
U-
V+
V-
W+
W-
FG1
FG2
5VD
FG
GNDD
HALL U
HALL V
HALL W
HEAD MOTOR DRIVER
14VM1
5300
7300
TDA5241
REEL
3313
13
50
58
PG/FG
6
55
56
57
14
MOTØ
1930-4
18
MOT1
1930-1
3
MOT2
1930-3
16
MOT3
1930-2
5
POS
1930-5
1930-6
HEAD-DISC MOTOR
POS
ISTBY
CSW
HEHI
HELO
14VM1
-28V
9/14 VM2
5VD
5VASW
PS
SUPPLY VOLTAGES AND BUS DIAGRAM
HP2
SDA
SCL
TRIA/ALI
MTA
IREV
SDA2
SCL2
SDA
SCL
SDA
SCL
SFS
HP2
IRAF
SDA
SCL
AF
AL
I/O
FV
HA
QNIC
BLOCK DIAGRAM AUDIO
CSI
PBV
ISWS
IREV
SDA2
SCL2
CROT
CSCP
CKDET
FFP
CSYNC
SCL
SDA
CSI
BCS2
BSC1
SDA
SCL
SDA
SCL
PSS
AGC
AFC
SB1
SWIN
TRIV
ENVC
SDA
SCL
OCS
ODAT
OCLK
OFP
CSYNC2
FOME
VS-S
VS
I/O
FV
HA
VP/PD
OSD
FM
BLOCK DIAGRAM VIDEO
Interconnections:
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OS page 3-23
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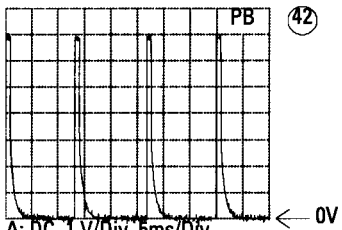
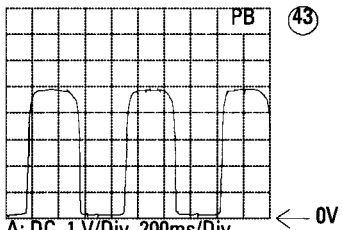
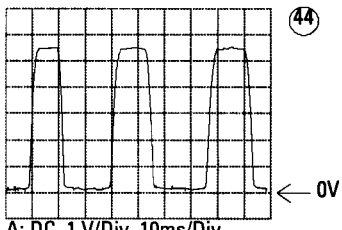
VP/PD page 3-23
VS page 3-18
VS_S page 3-20
ROM
1
2
3
4
7
GNDD
QBD_DIG.DWG PIC 970217



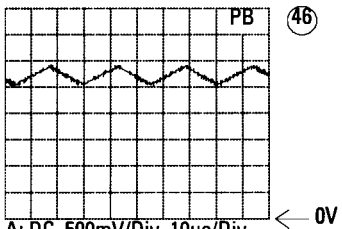
A: DC, 1 V/Div, 5ms/Div
T 7463 Emitter



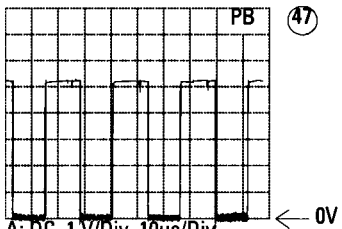
A: DC, 1 V/Div, 200ms/Div
IC 7460 Pin 6, 7



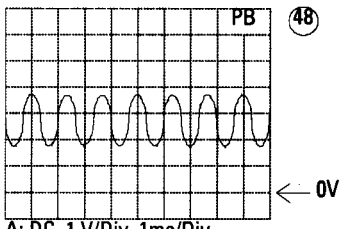
A: DC, 1 V/Div, 10ms/Div
7466



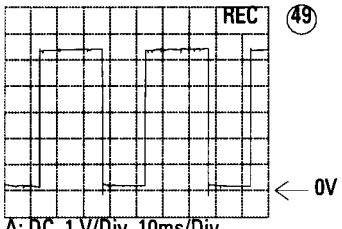
A: DC, 500mV/Div, 10us/Div
Connector 1930 Pin 6



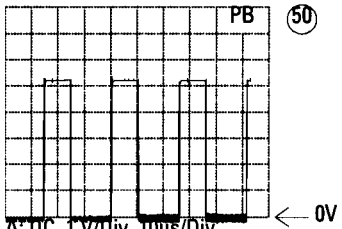
A: DC, 1 V/Div, 10us/Div
IC 7400 Pin 25



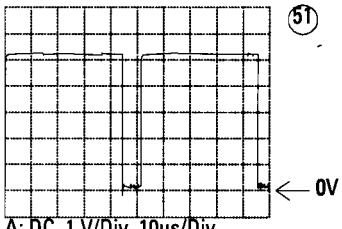
A: DC, 1 V/Div, 1ms/Div
Connector 1946 Pin 4



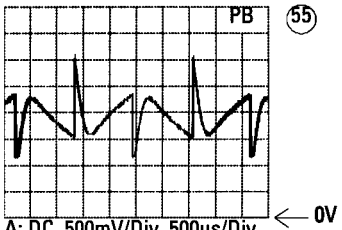
A: DC, 1 V/Div, 10ms/Div
IC 7460 Pin 2



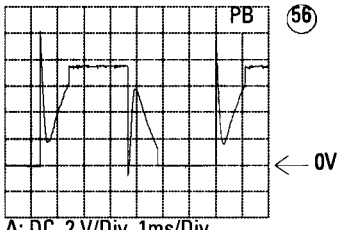
A: DC, 1 V/Div, 10us/Div
IC 7400 Pin 24



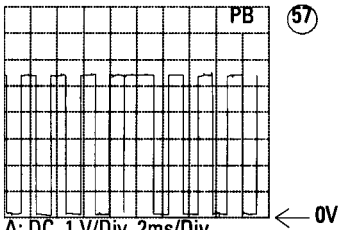
A: DC, 1 V/Div, 10us/Div
IC 7400 Pin 10



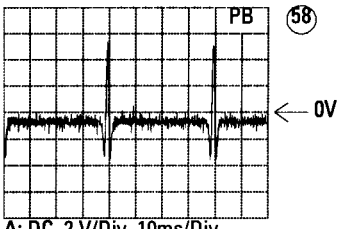
A: DC, 500mV/Div, 500us/Div
Connector 1930 Pin 4



A: DC, 2 V/Div, 1ms/Div
Connector 1930 Pin 1, 2, 3

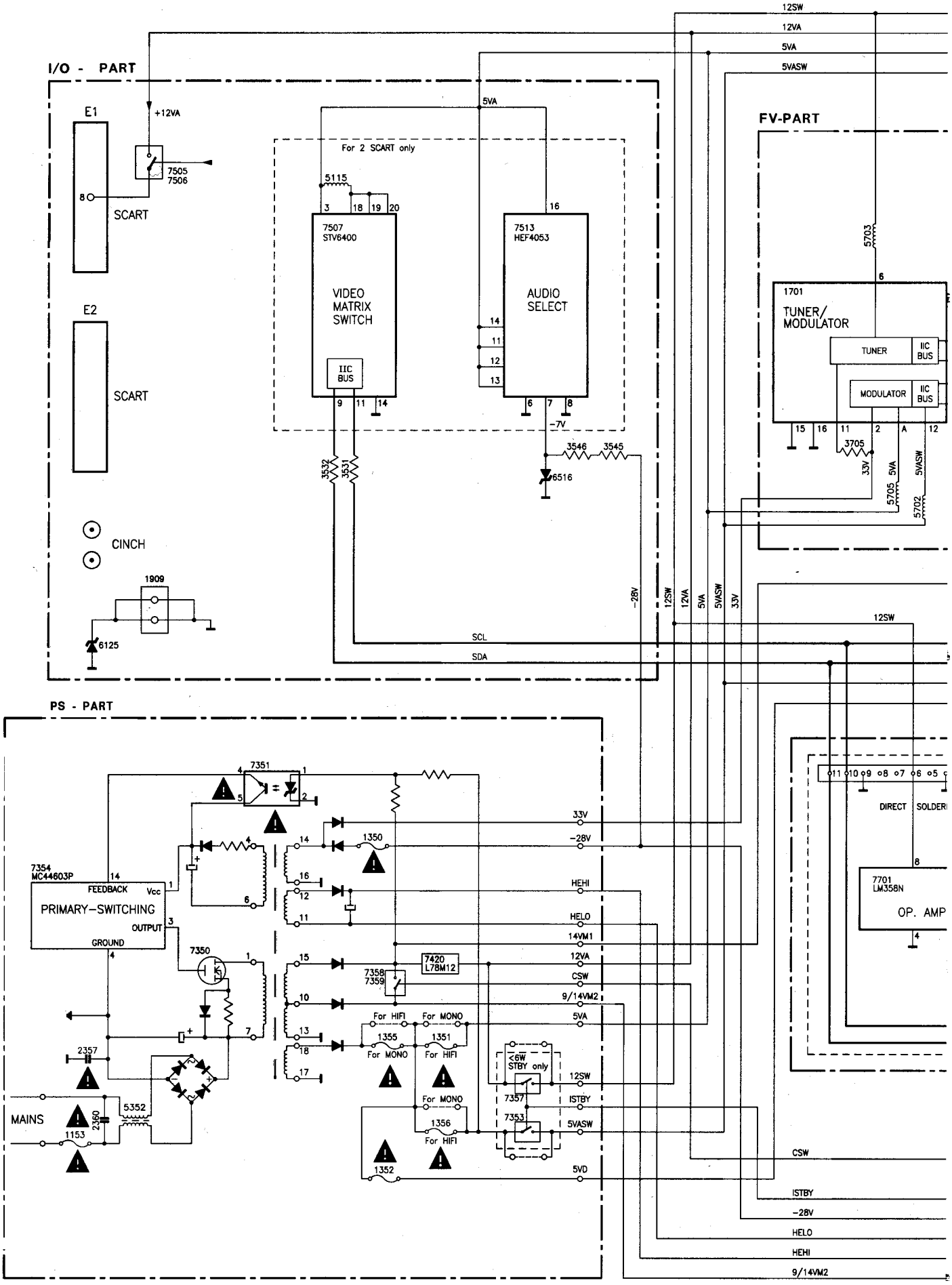


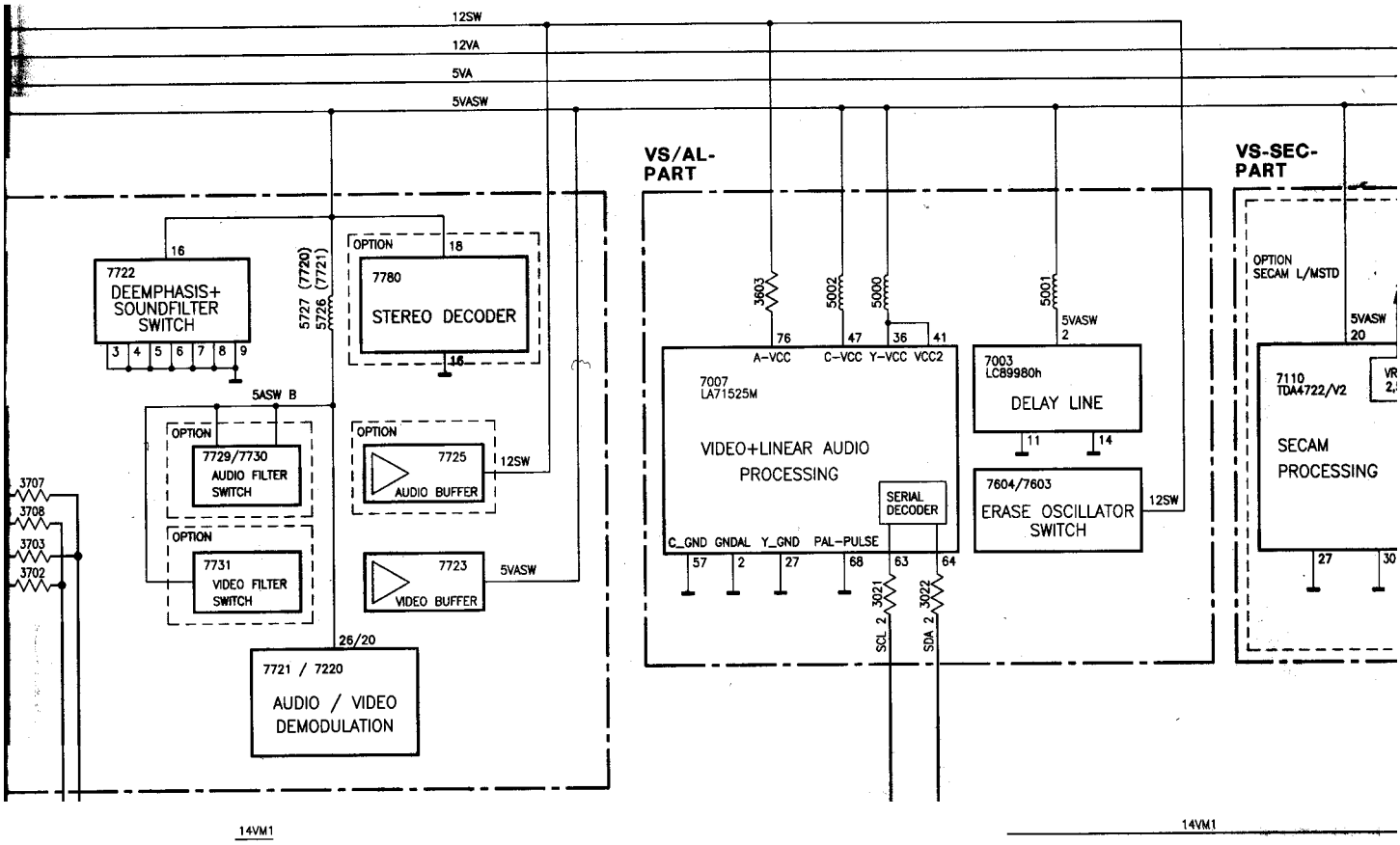
A: DC, 1 V/Div, 2ms/Div
IC 7400 Pin 12

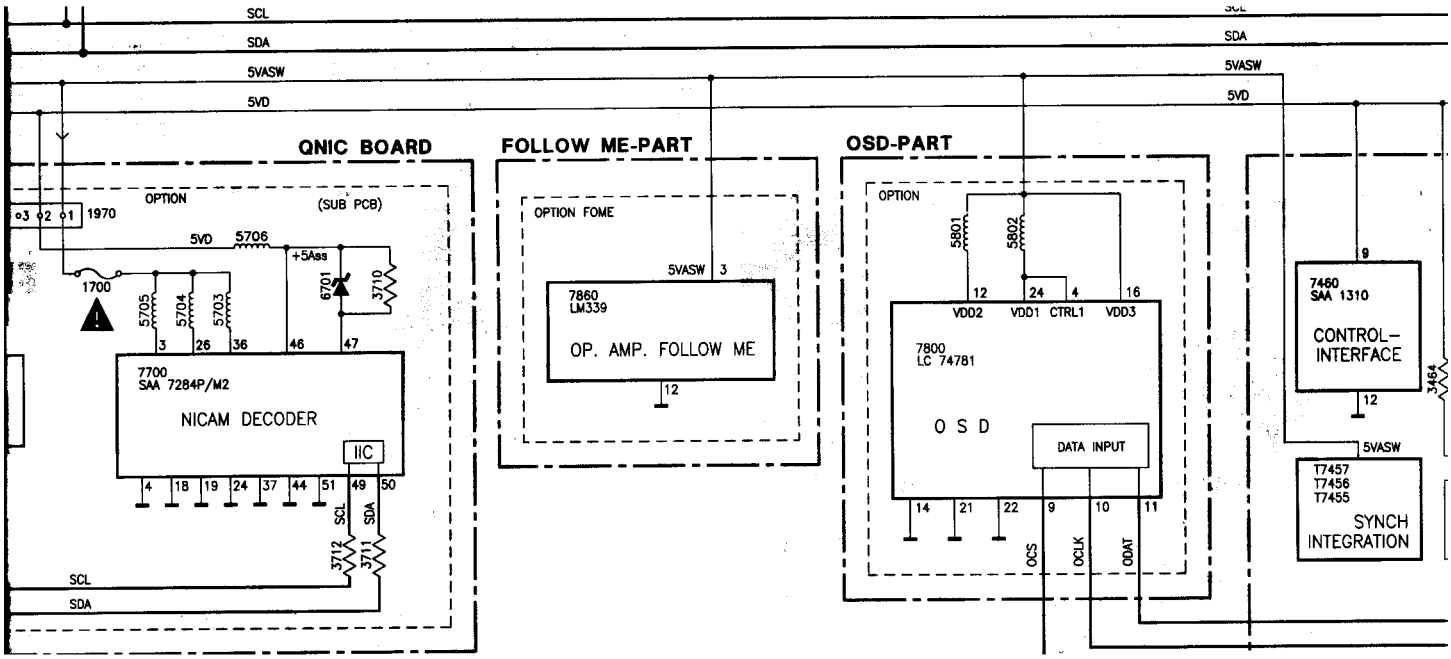


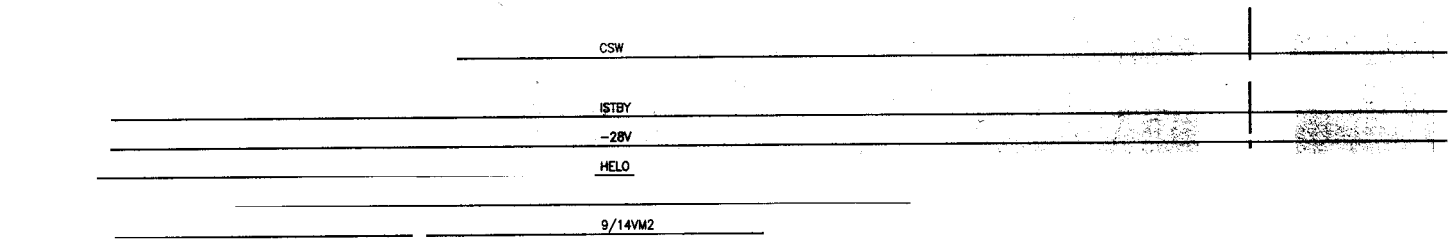
A: DC, 2 V/Div, 10ms/Div
Connector 1930 Pin 5

Supply Voltages and Bus Diagram




12SW
12VA
5VA
5VASW
VS/AL-PART
VS-SEC-PART
7722
DEEMPHASIS+ SOUNDFILTER SWITCH
OPTION
7780
STEREO DECODER
5727 (7720)
5726 (7721)
5ASW B
7729/7730
AUDIO FILTER SWITCH
7731
VIDEO FILTER SWITCH
7725
AUDIO BUFFER
7723
VIDEO BUFFER
3707
3708
3703
3702
26/20
7721 / 7220
AUDIO / VIDEO DEMODULATION
7007
LA71525M
VIDEO+LINEAR AUDIO PROCESSING
SERIAL DECODER
A-VCC
C-VCC
Y-VCC
VCC2
C_GND
GNDAL
Y_GND
PAL-PULSE
7003
LC89980h
DELAY LINE
7604/7603
ERASE OSCILLATOR SWITCH
OPTION SECAM L/MSTD
7110
TDA4722/V2
SECAM PROCESSING
14VM1


SCL
SDA
5VASW
5VD
QNIC BOARD
FOLLOW ME-PART
OSD-PART
OPTION
(SUB PCB)
1970
1700
5706
+5Ass
6701
3710
5705
5704
5703
7700
SAA 7284P/M2
NICAM DECODER
IIC
3712
3711
OPTION FOME
7860
LM339
OP. AMP. FOLLOW ME
5801
5802
7800
LC 74781
O S D
DATA INPUT
VDD2
VDD1
CTRL1
VDD3
OCS
OCLK
ODAT
7460
SAA 1310
CONTROL-INTERFACE
3464
T7457
T7456
T7455
SYNCH INTEGRATION


CSW
ISTBY
-28V
HELO
9/14VM2

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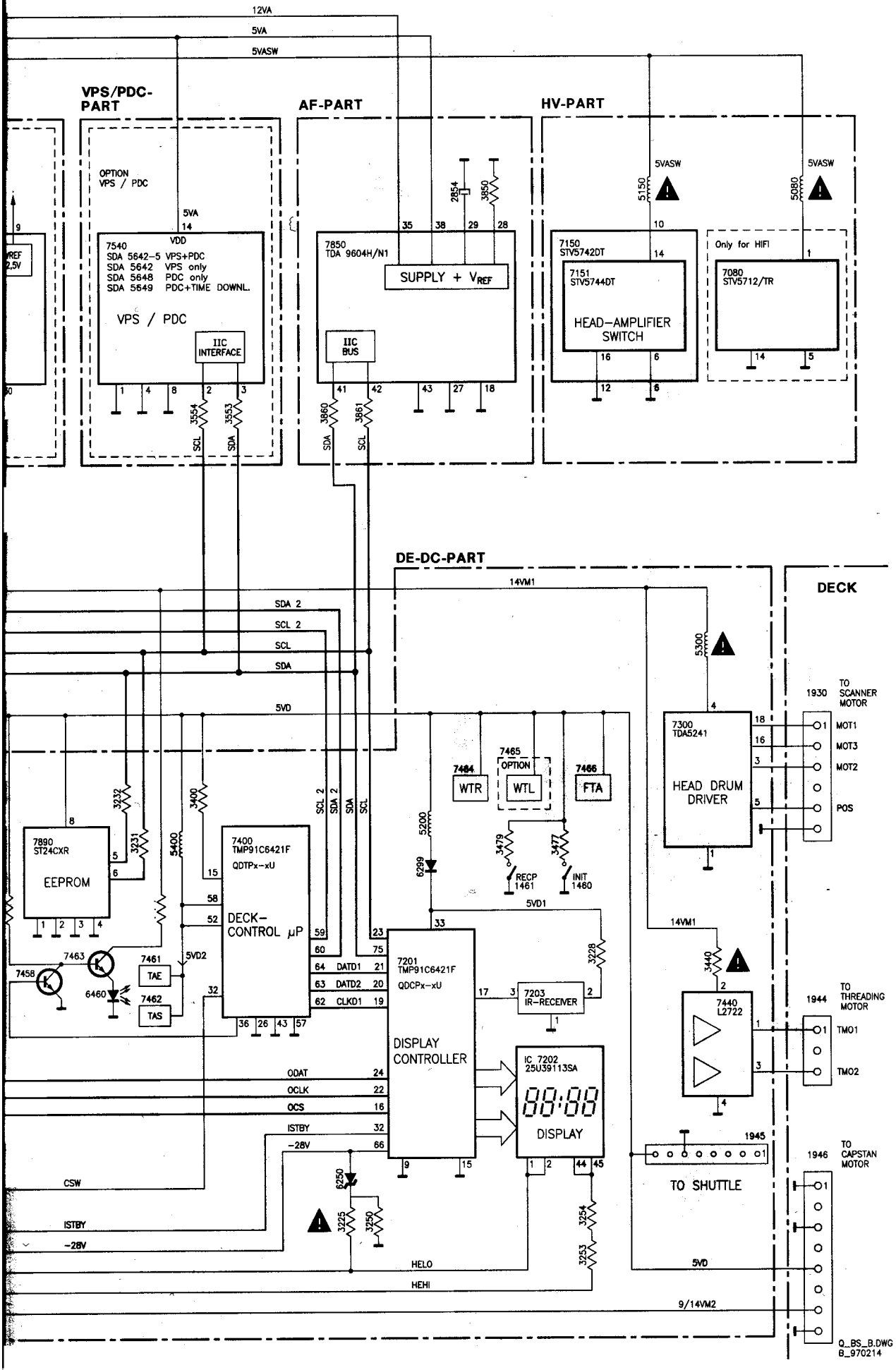
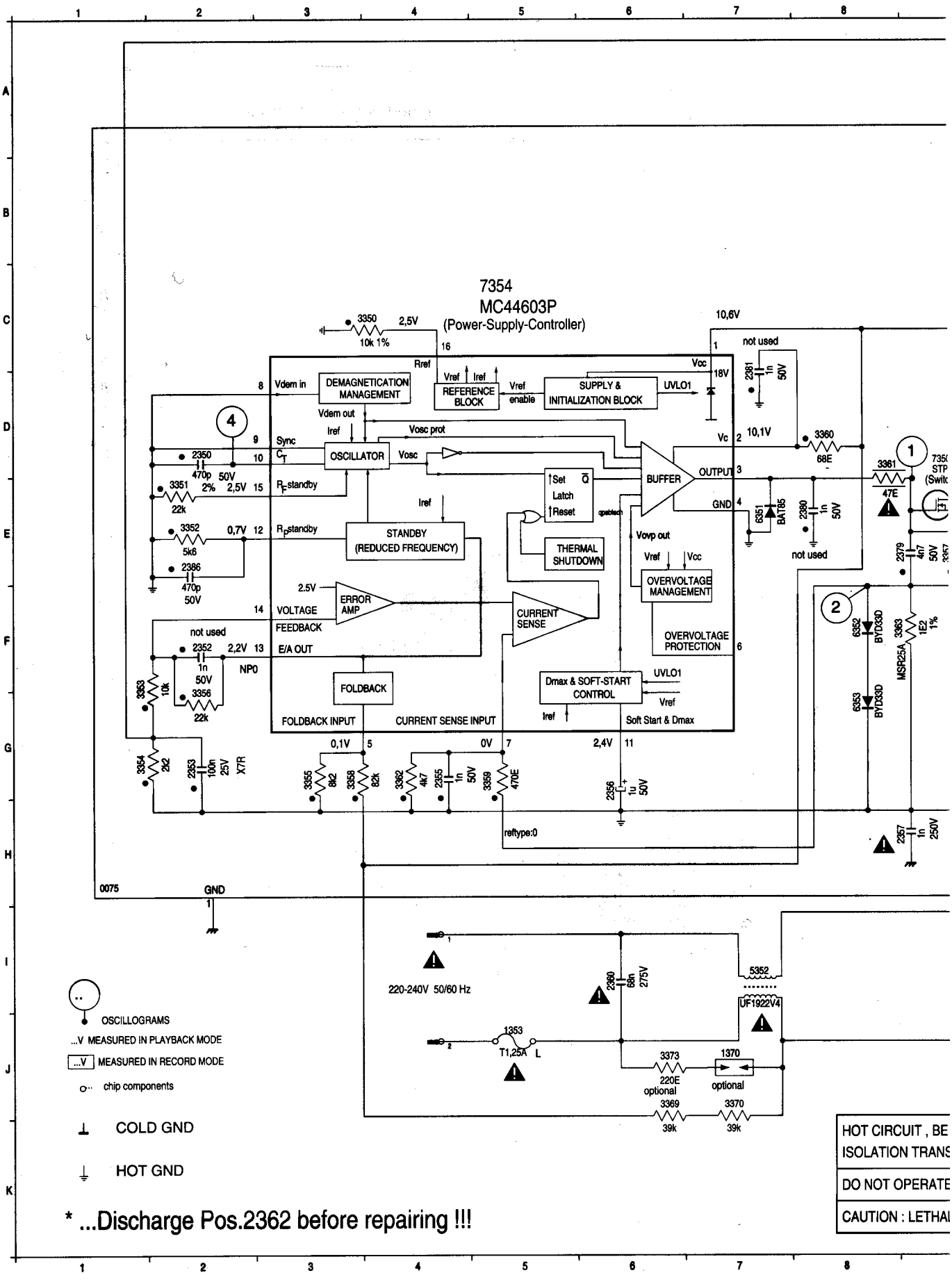
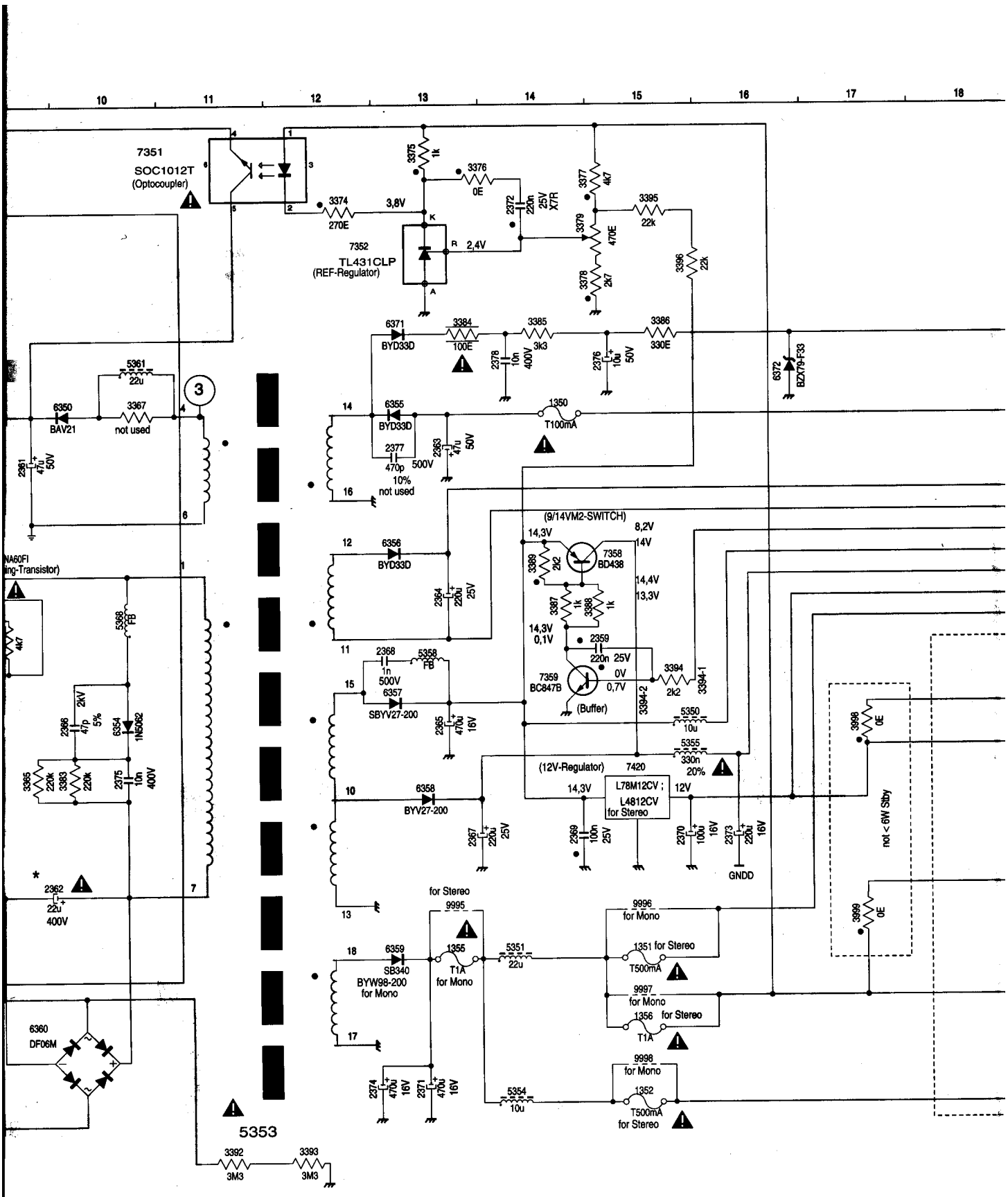


Power Supply (PS)





CAREFUL AND USE AN
FORMER WHEN SERVICING

WITHOUT CASE

POTENTIALS AT PRIMARY

Interconnections:

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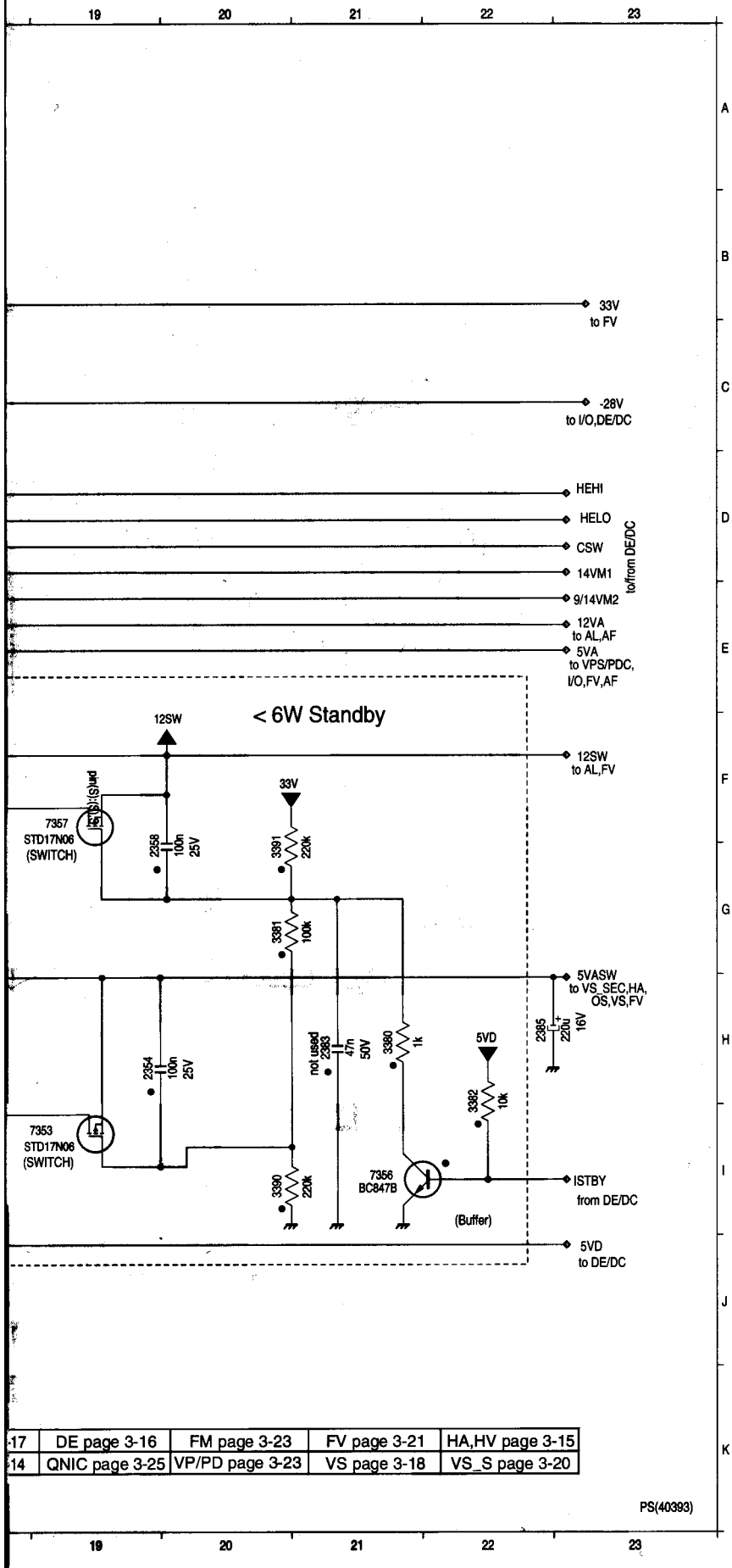

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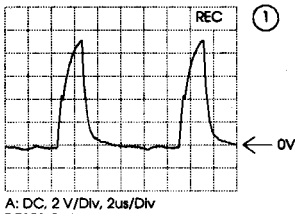
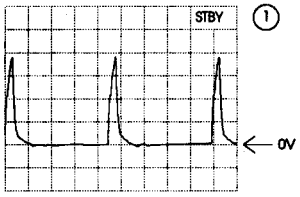
-14	QNIC page 3-25	VP/PD page 3-23	VS page 3-18	VS_S page 3-20

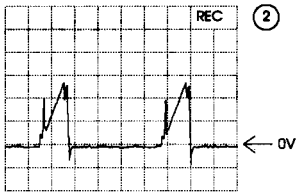
	0075 H 1	7358 D15	
	1350 C14	7359 F14	
	1351 H15	7420 F15	
	1352 J15	9995 H13	
	1353 J 5	9996 H15	
	1355 H13	9997 I15	
A	1356 I15	9998 I15	
	1370 J 7		
	2350 D 2		
	2352 F 2		
	2353 G 2		
	2354 H19		
	2355 G 4		
	2356 G 6		
	2357 H 9		
	2358 G19		
	2359 E15		
B	2360 I 6		
	2361 D 9		
	2362 H 9		
	2363 C13		
	2364 E13		
	2365 F13		
	2366 F10		
	2367 G13		
	2368 E13		
	2369 G14		
C	2370 G15		
	2371 I13		
	2372 A14		
	2373 G16		
	2374 I12		
	2375 G10		
	2376 C15		
	2377 C13		
	2378 C14		
	2379 E 9		
D	2380 E 8		
	2381 D 7		
	2383 H21		
	2385 H22		
	2386 E 2		
	3350 C 4		
	3351 E 2		
	3352 E 2		
	3353 F 1		
	3354 G 1		
E	3355 G 3		
	3356 G 2		
	3357 E 9		
	3358 G 3		
	3359 G 5		
	3360 D 8		
	3361 D 8		
	3362 G 4		
	3363 F 9		
	3365 G 9		
F	3367 C10		
	3369 J 6		
	3370 J 7		
	3373 J 6		
	3374 A12		
	3375 A13		
	3376 A14		
	3377 A15		
	3378 B15		
	3379 A14		
G	3380 H21		
	3381 G20		
	3382 H22		
	3383 G10		
	3384 B13		
	3385 B14		
	3386 B15		
	3387 E14		
	3388 E15		
	3389 E14		
H	3390 I20		
	3391 G20		
	3392 J11		
	3393 J12		
	3394 F15		
	3395 A15		
	3396 B15		
	3998 F17		
	3999 H17		
	5350 F15		
	5351 H14		
I	5352 I 7		
	5353 J11		
	5354 J14		
	5355 F15		
	5358 E13		
	5361 C10		
	5368 E10		
	6350 C10		
	6351 E 7		
J	6352 F 8		
	6353 G 8		
	6354 F10		
	6355 C13		
	6356 D13		
	6357 F13		
	6358 G13		
	6359 H13		
	6360 I 9		
	6371 B13		
	6372 C16		
	7350 D 9		
K	7351 A10		
	7352 B12		
	7353 I19		
	7354 C 5		
	7356 I21		
	7357 F19		



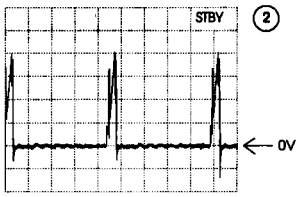
A: DC, 2 V/Div, 2us/Div
T 7350 Gate



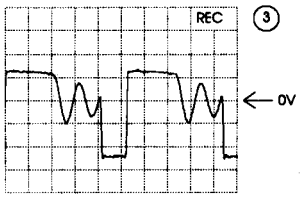
A: DC, 2 V/Div, 5us/Div
T 7350 Gate



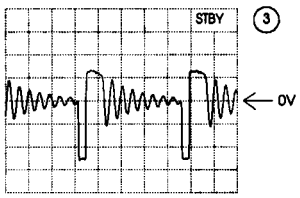
A: DC, 200mV/Div, 2us/Div
T 7350 Source



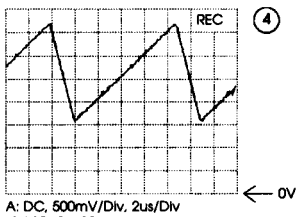
A: DC, 100mV/Div, 5us/Div
T 7350 Source



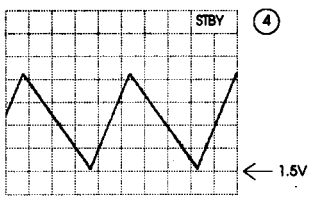
A: DC, 10 V/Div, 2us/Div
5353 Pin 4



A: DC, 10V/Div, 5us/Div
5353 Pin 4

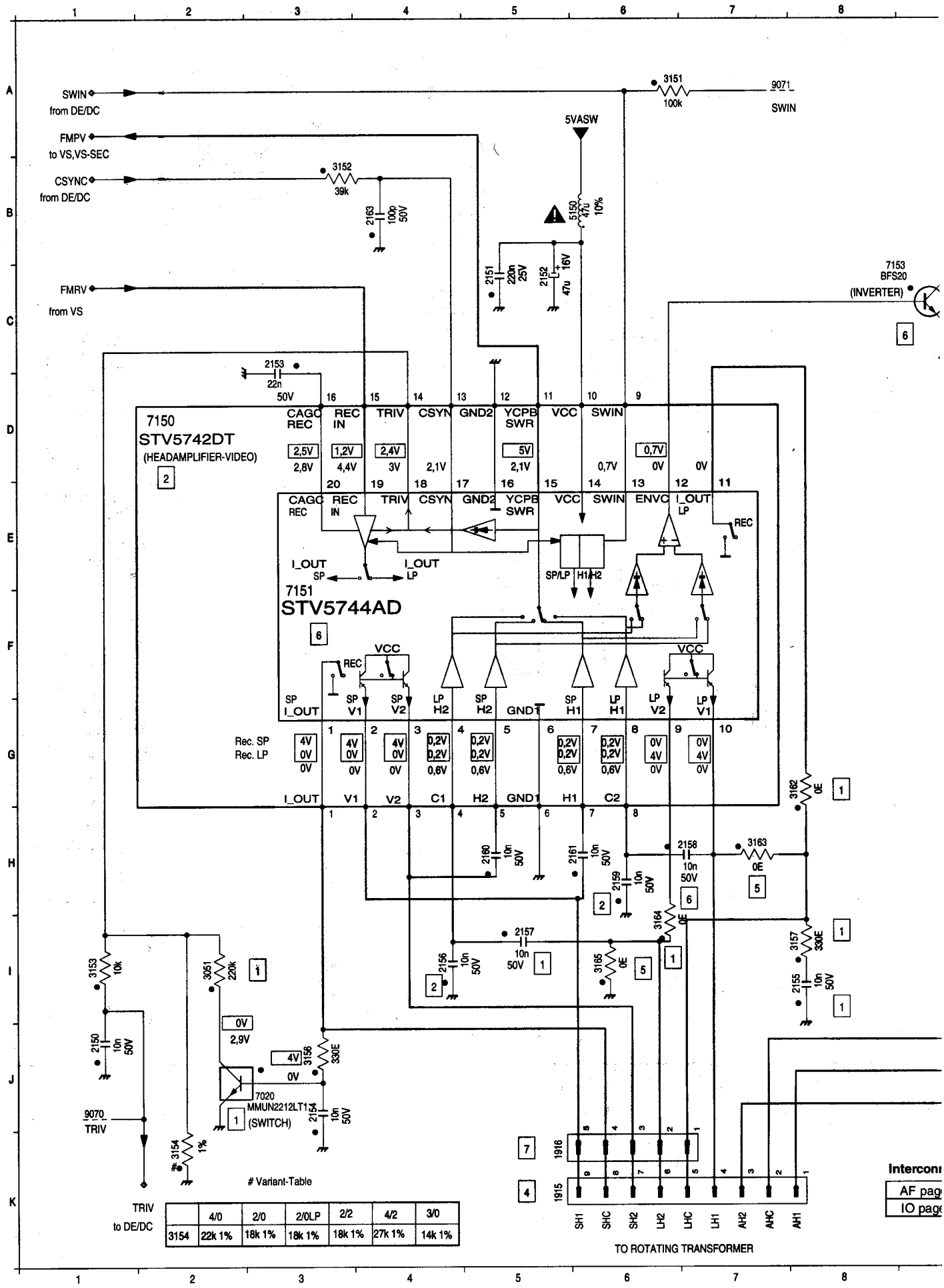


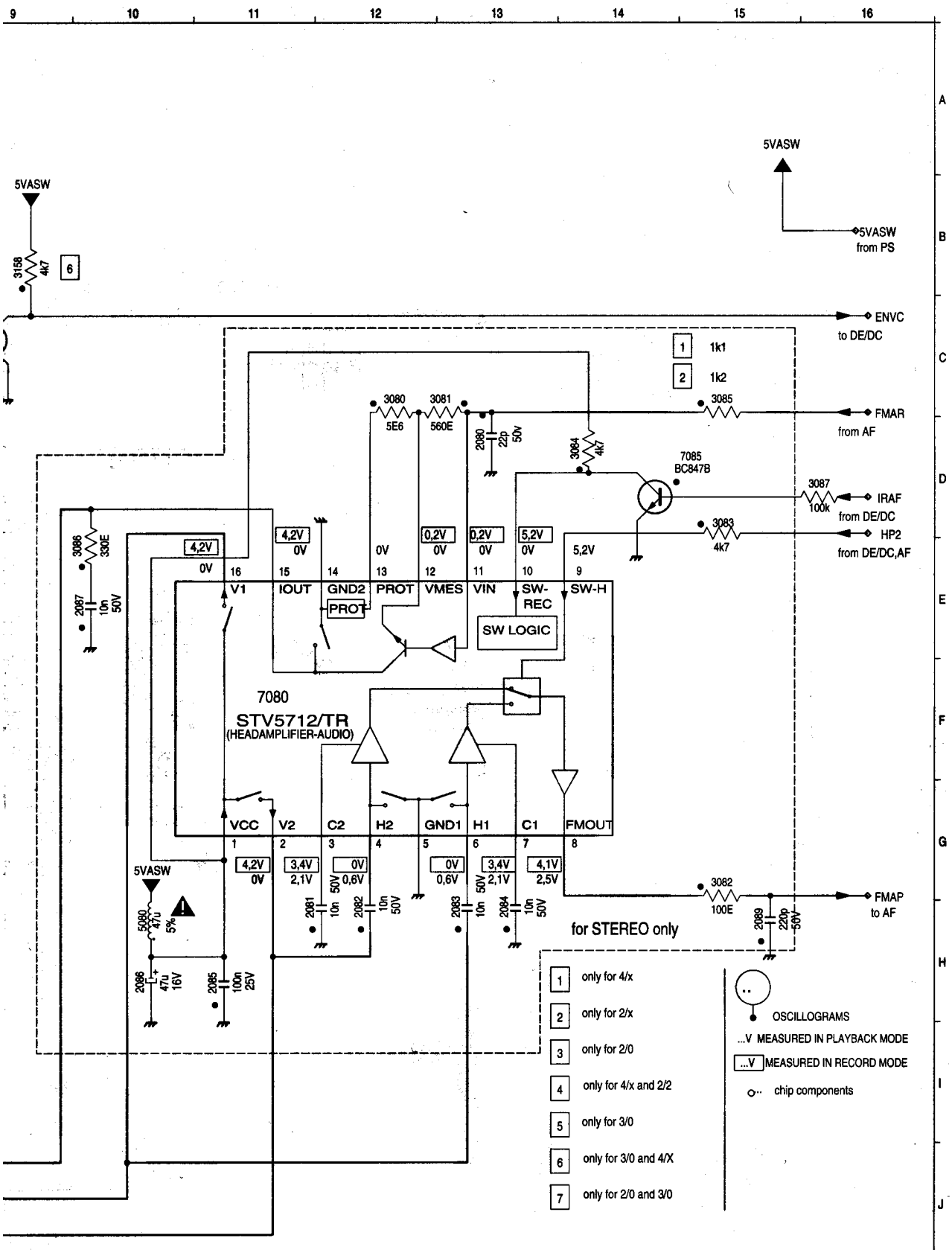
A: DC, 500mV/Div, 2us/Div
IC 7354 Pin 10



A: AC, 500mV/Div, 5us/Div
IC 7354 Pin 10

Head Amplifier (HA)



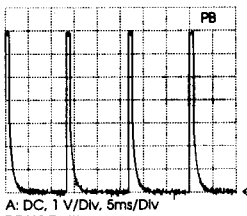


1915 K5
1916 K5
2080 D13
2081 H11
2082 H12
2083 H13
2084 H13
2085 H11
2086 H10
2087 E10
2089 H15
2150 J1
2151 C5
2152 C5
2153 C3
2154 J3
2155 I8
2156 I4
2157 I5
2158 H7
2159 H6
2160 H5
2161 H6
2163 B4
3051 I2
3080 C12
3081 C13
3082 G15
3083 D15
3084 D14
3085 C15
3086 E10
3087 D16
3151 A6
3152 B3
3153 I1
3154 K2
3156 J3
3157 I8
3158 B9
3162 G8
3163 H7
3164 I6
3165 I6
5080 H10
5150 B6
7020 J3
7080 F11
7085 D15
7150 D2
7151 F3
7153 C8
9070 J1
9071 A7

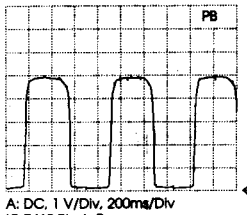
ıections:

ɜ 3-22	AL page 3-18	DC page 3-17	DE page 3-16	FM page 3-23	FV page 3-21	HA,HV page 3-15
ɜ 3-19	OS page 3-23	PS page 3-14	QNIC page 3-25	VP/PD page 3-23	VS page 3-18	VS_S page 3-20

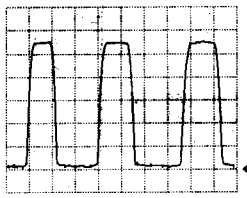
Deck Electronics (DE)



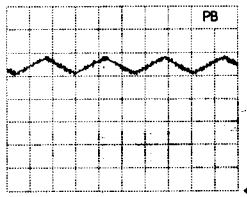
A: DC, 1 V/Div, 5ms/Div
T 7463 Emitter



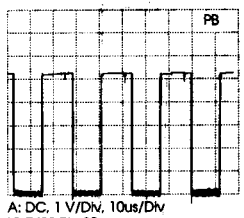
A: DC, 1 V/Div, 200ms/Div
IC 7460 Pin 6, 7



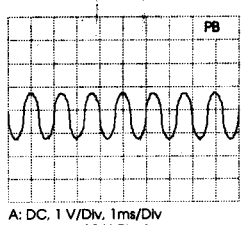
A: DC, 1 V/Div, 10ms/Div
7466



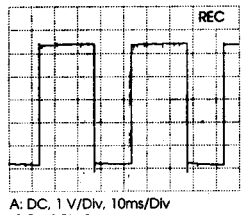
A: DC, 500mV/Div, 10us/Div
Connector 1930 Pin 6



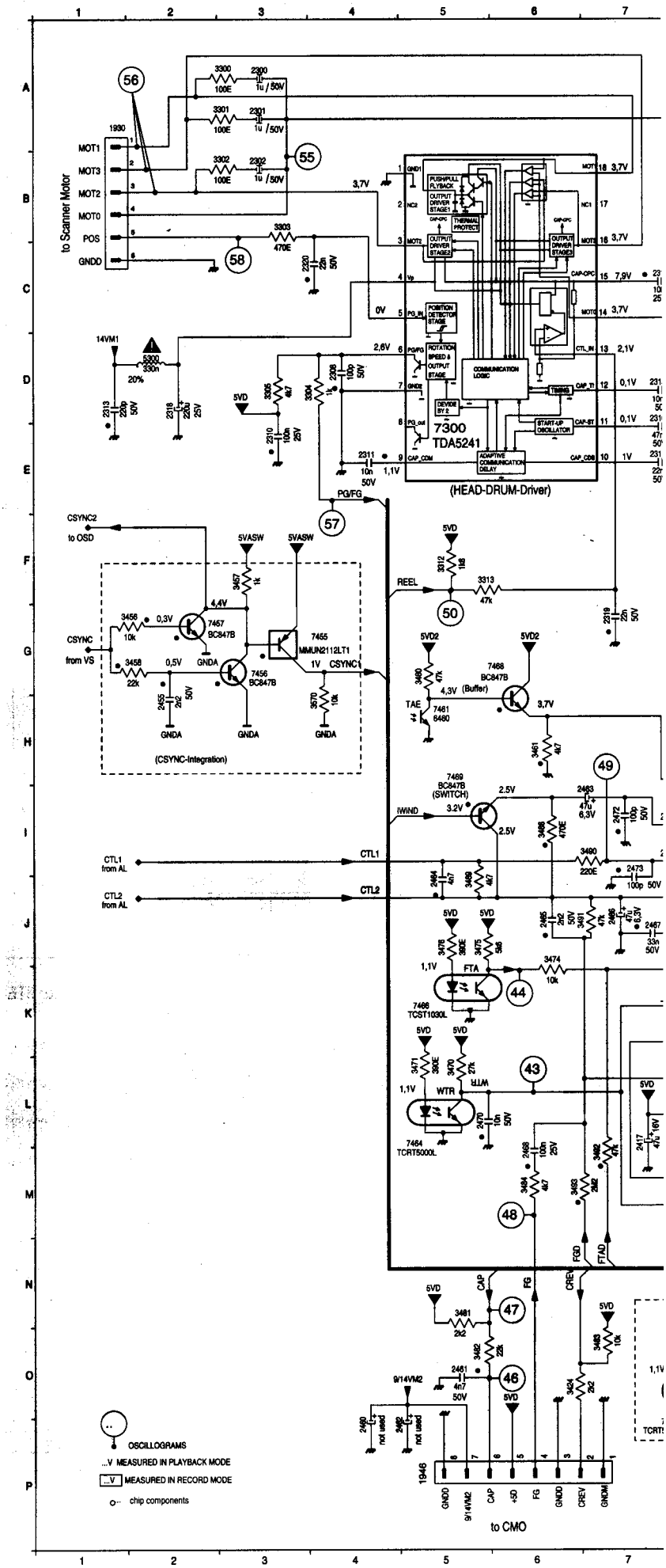
A: DC, 1 V/Div, 10us/Div
IC 7400 Pin 25

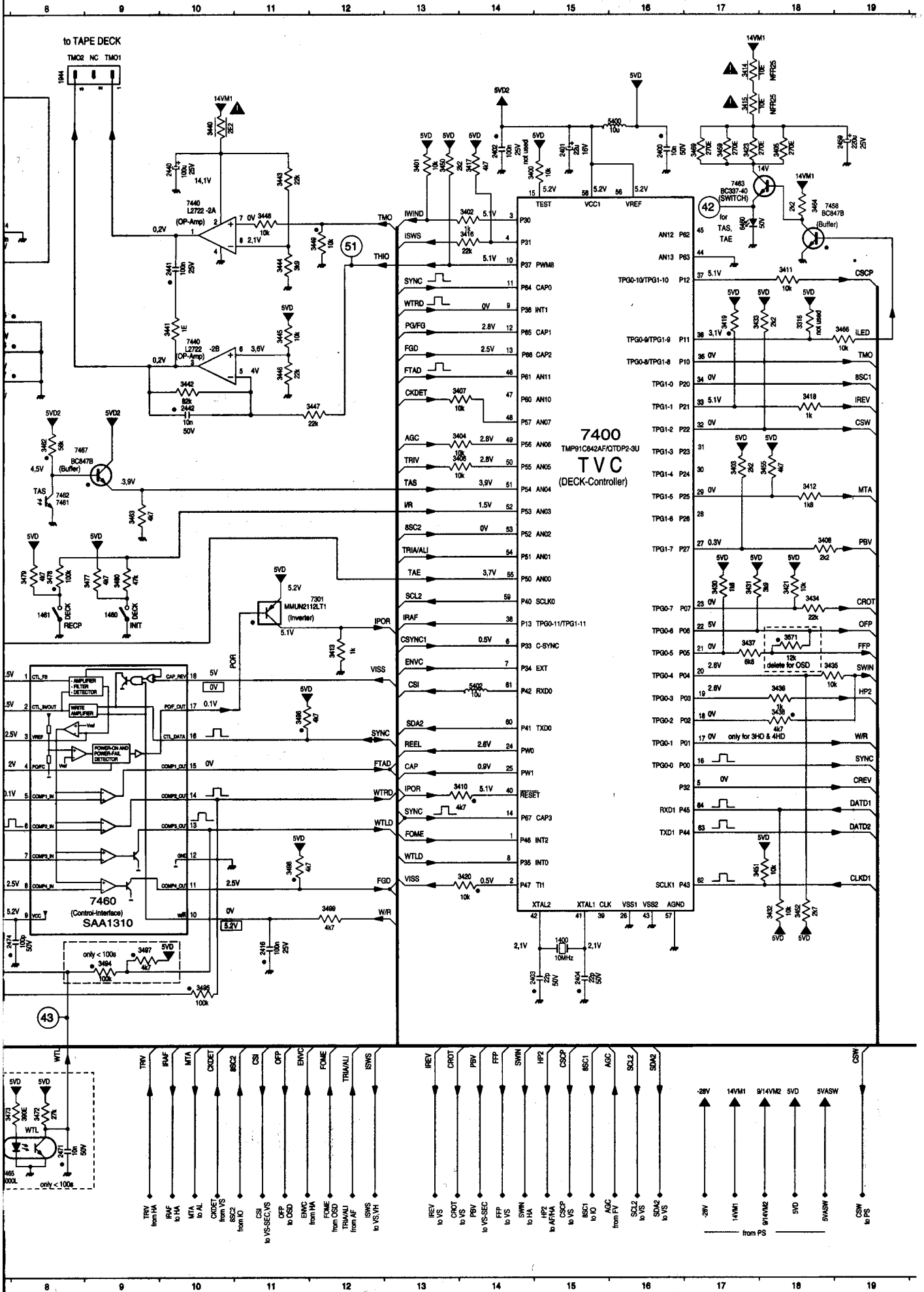


A: DC, 1 V/Div, 1ms/Div
Connector 1946 Pin 4

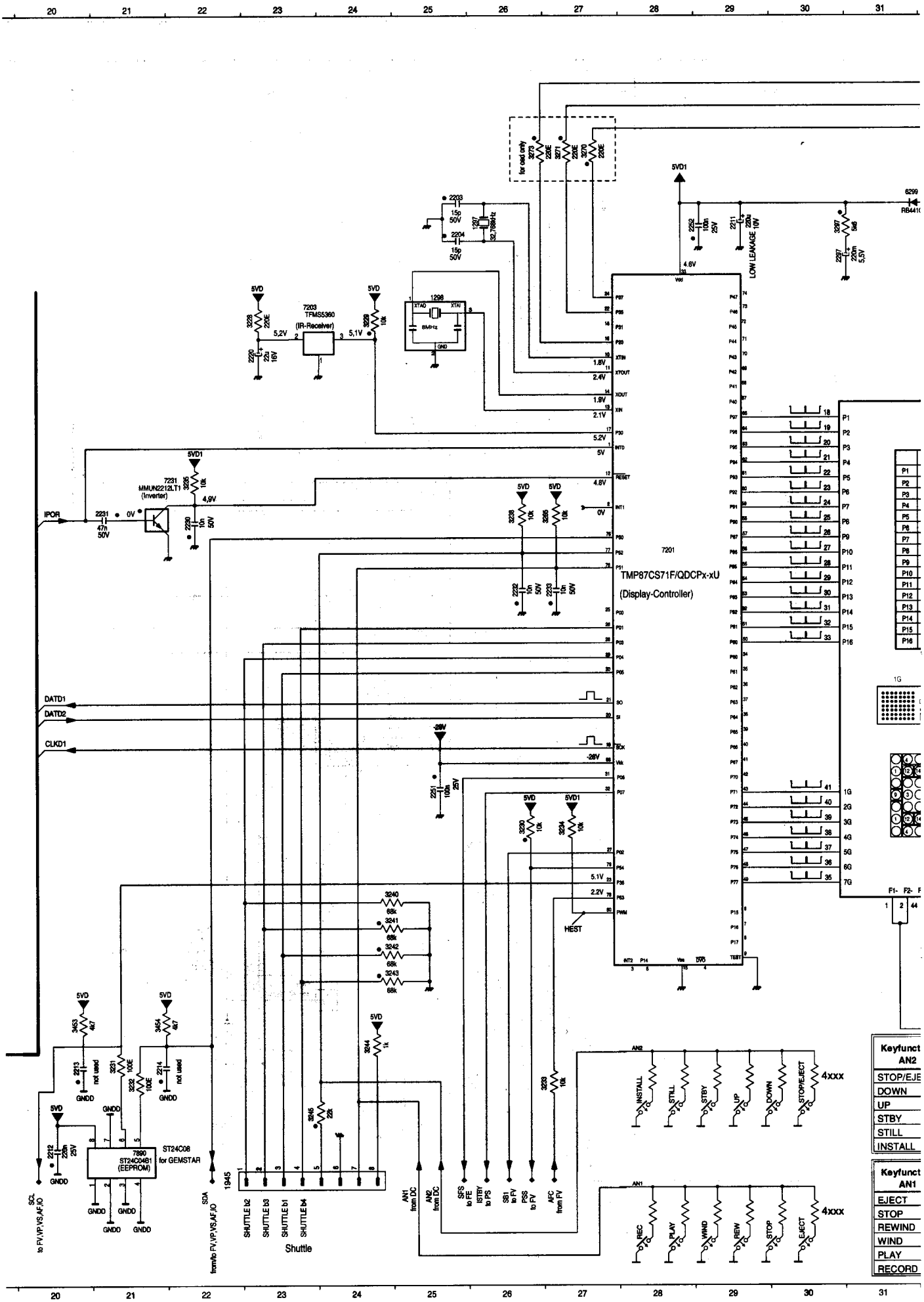


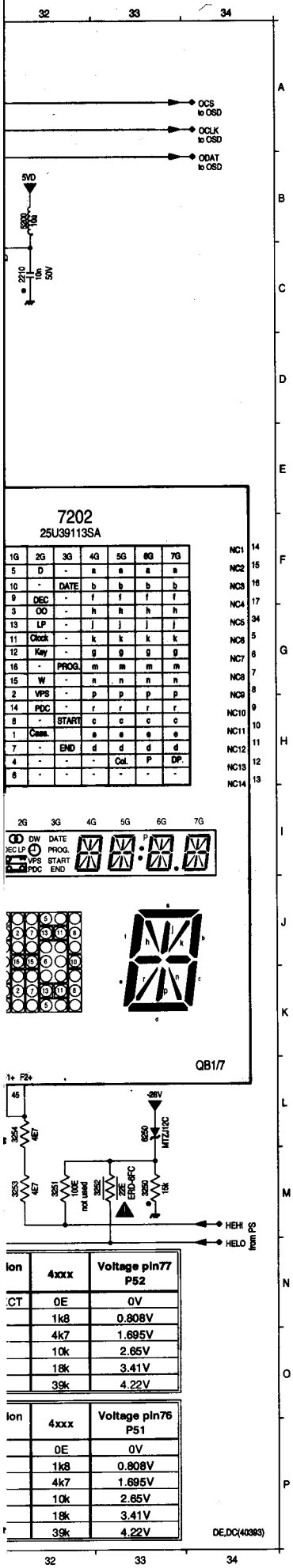
A: DC, 1 V/Div, 10ms/Div
IC 7460 Pin 2




to TAPE DECK
TMO2 NC TMO1
7400
TMP91C642AF/QTDP2-3U
TVC
(DECK-Controller)
7460
(Control-Interface)
SAA1310
7440
L2722 -2A
(OP-Amp)
7440
L2722 -2B
(OP-Amp)
7463
BC337-40
(SWITCH)
7458
BC847B
(Buffer)
7467
BC847B
(Buffer)
7462
7461
7301
MMUN2112LT1
(Inverter)
TAS
RECP
INIT
TMO
THIO
IWIND
ISWS
SYNC
WTRD
PG/FG
FGD
FTAD
CKDET
AGC
TRIV
TAS
IR
8SC2
TRIA/ALI
TAE
SCL2
IRAF
CSYNC1
ENVC
CSI
SDA2
REEL
CAP
IPOR
RESET
FOME
WTLD
VISS
CSCP
IREV
CROT
PBV
FFP
SWIN
HP2
8SC1
CKOET
OFP
ILED
OSP
W/R
CREV
DATD1
DATD2
CLKD1
CSW
POR
WTL
only < 100s
delete for OSD
only for 3HD & 4HD
TEST
VCC1
VREF
XTAL2
XTAL1
CLK
VSS1
VSS2
AGND
10MHz
from HA
to HA
to AL
from VS
from IO
to VS-SEC,VS
to OSD
from HA
from OSD
from AF
to VS,VH
to VS
to VS-SEC
to HA
to AF/HA
to VS
to IO
from FV
to VS
to VS
-28V
14VM1
9/14VM2
5VD
5VASW
CSW
from PS
to PS

Display Control (DC)



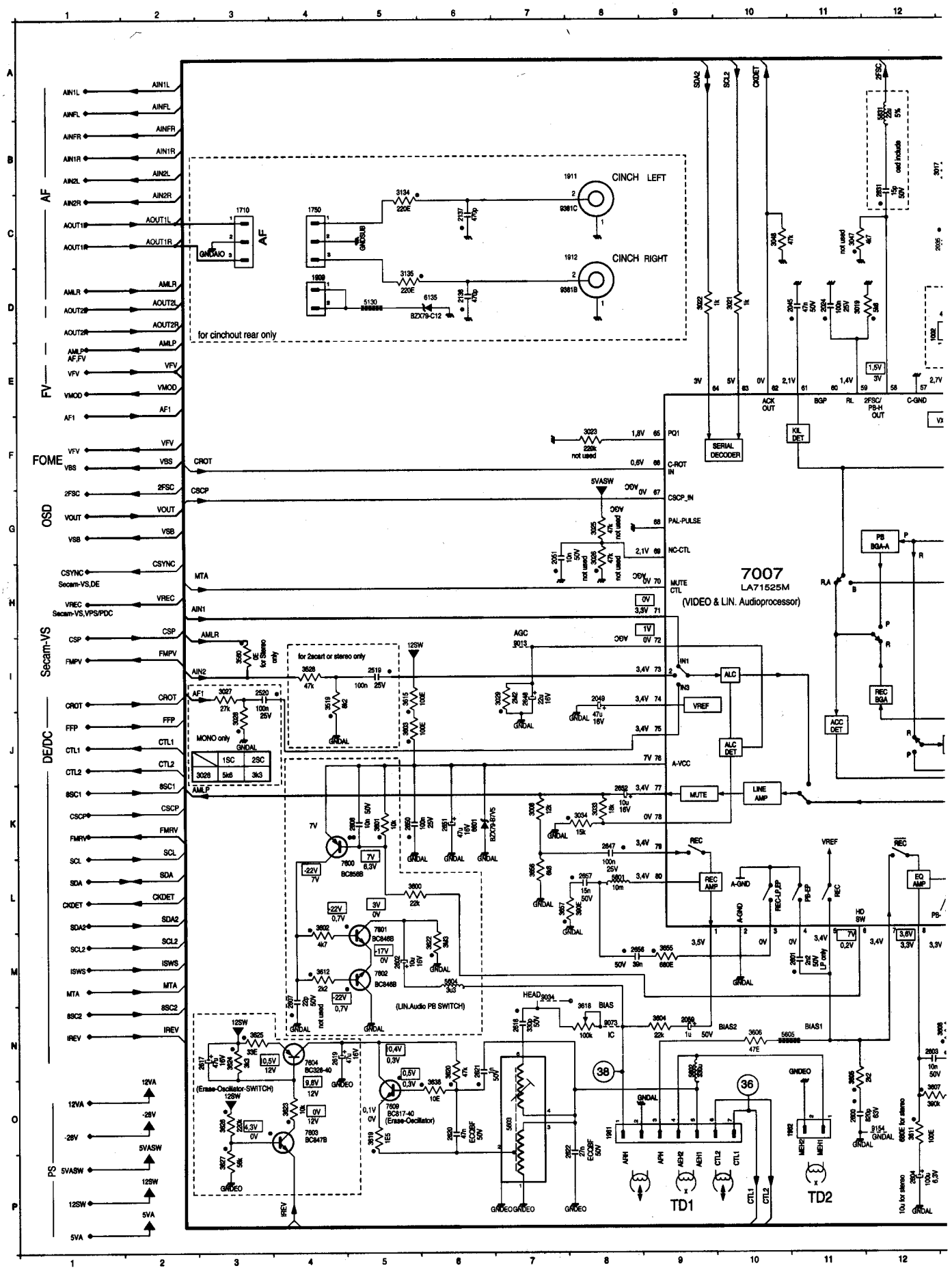


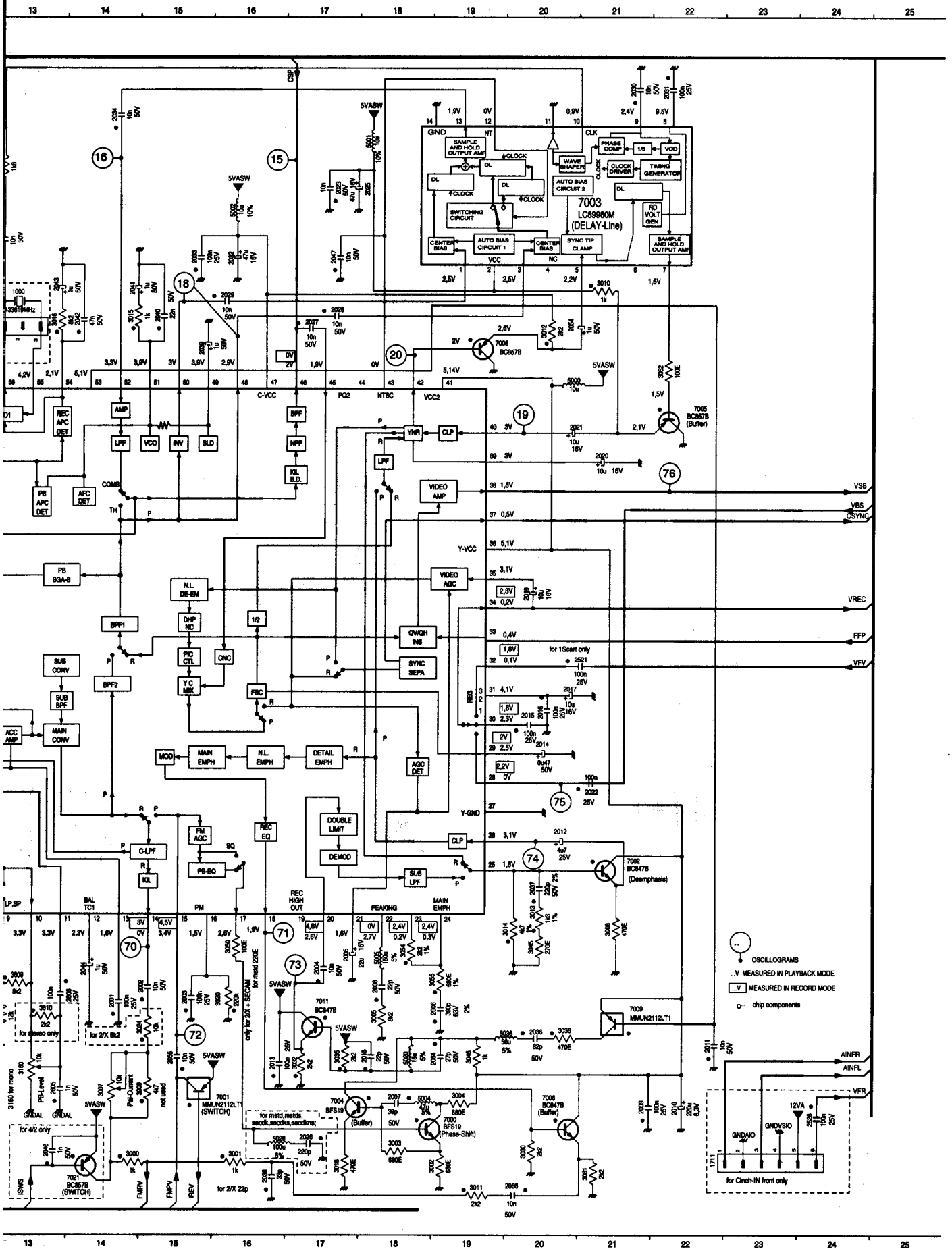
Ion	4xxx	Voltage pin77 P52
CT	0E	0V
	1k8	0.808V
	4k7	1.695V
	10k	2.65V
	18k	3.41V
	39k	4.22V

Ion	4xxx	Voltage pin76 P51
	0E	0V
	1k8	0.808V
	4k7	1.695V
	10k	2.65V
	18k	3.41V
	39k	4.22V

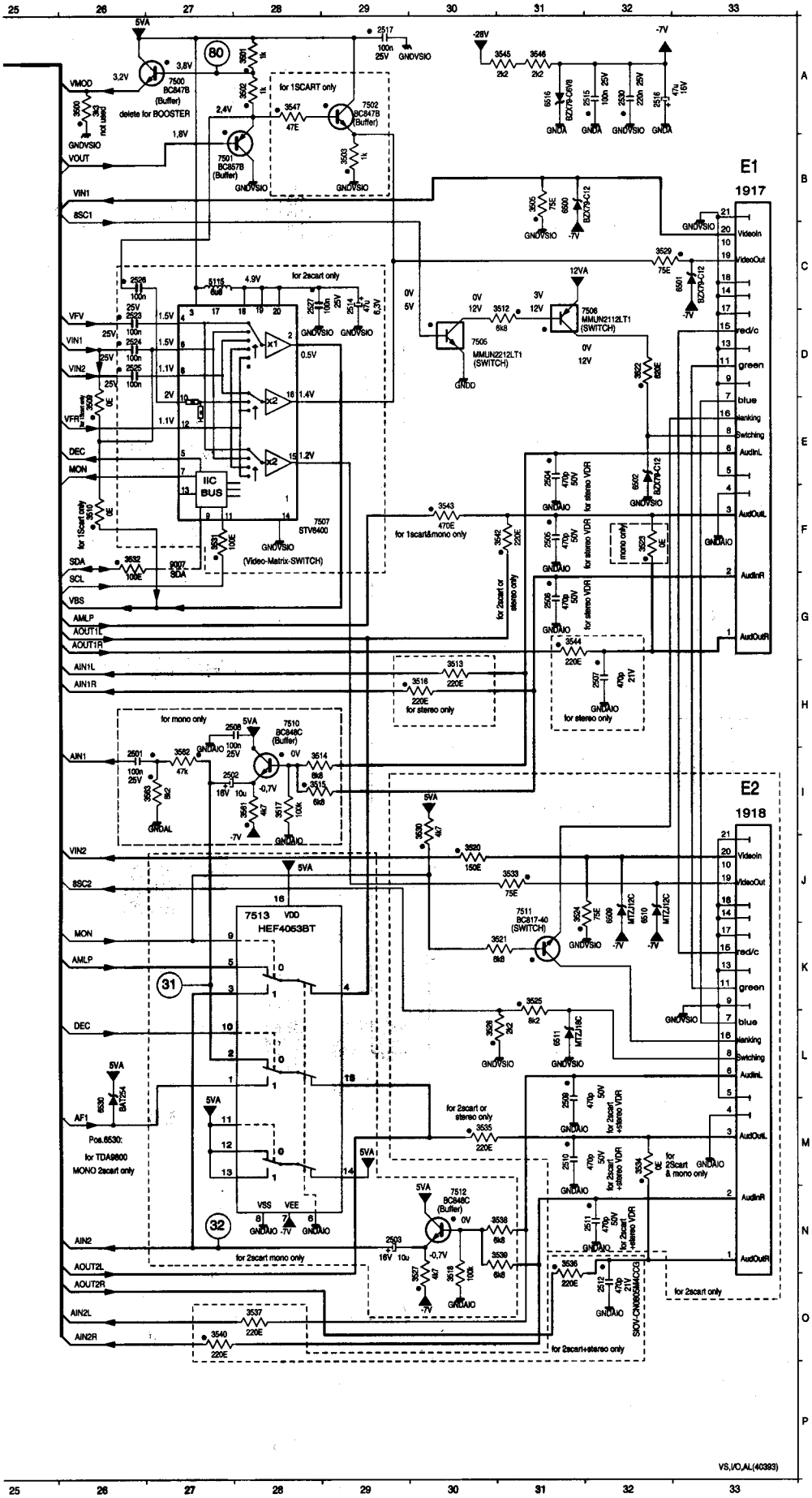
| | | |

Video Signal Processing (VS), Audio Linear (AL)




7003
LC89980M
(DELAY-Line)
SAMPLE AND HOLD OUTPUT AMP
PHASE COMP
VCO
WAVE SHAPER
CLOCK DRIVER
TIMING GENERATOR
AUTO BIAS CIRCUIT 2
SWITCHING CIRCUIT
RD VOLT GEN
CENTER BIAS
AUTO BIAS CIRCUIT 1
SYNC TIP CLAMP
7008
BC857B
7005
BC857B
(Buffer)
REC APC DET
AMP
LPF
VCO
SW
SLD
BPF
NPP
KIL B.D.
PB APC DET
AFC DET
VIDEO AMP
VIDEO AGC
PB BGA-II
N.L. DE-EM
DHP NC
BPF1
BPF2
SUB CONV
SUB BPF
MAIN CONV
PIC CTL
CNC
Y.C MIX
1/2
FBC
CW/QH INS
SYNC SEPA
for 1Scart only
MOD
MAIN EMPH
N.L. EMPH
DETAIL EMPH
AGC DET
FM AGC
REC EQ
DOUBLE LIMIT
DEMOD
C-LPF
PB-EQ
KIL
SUB LPF
7002
BC847B
(Deemphasis)
OSCILLOGRAMS
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
chip components
7009
MMUN2112LT1
7011
BC847B
7001
MMUN2112LT1
(SWITCH)
7004
BFS19
(Buffer)
7000
BFS19
(Phase-Shift)
7006
BC847B
(Buffer)
7021
BC857B
(SWITCH)
for 4/2 only
for stereo only
for 2/X 8k2
for 2/X 22p
for matd,matds,
secdk,secdks,secdkns;
only for 2/X + SECAM
for mast 220E
for 3160 for mono
for Cinch-IN front only
PB-Level
PB-Current
not used
VSB
VBS
CSYNC
VREC
FFP
VFV
AINFR
AINFL
VFR
12VA
GNDAIO
GNDVSIO
SWS
FWRV
FWPV
REV
C-VCC
PQ2
NTSC
VCC2
Y-VCC
Y-GND
BAL TC1
PB
REC HIGH OUT
PEAKING
MAIN EMPH

In/Out (I/O)



1000	D13	3023	F 8	7506	C31		
1002	E12	3024	N15	7507	F29		
1710	C 3	3025	G 8	7510	H28		
1711	P22	3026	G 8	7511	J31		
1750	C 4	3027	I 3	7512	N30		
1909	D 4	3028	J 3	7513	J28		
1911	B 8	3029	I 7	7600	L 5		
1912	C 8	3030	P20	7601	L 5		
1917	B33	3031	P21	7602	M 5		
1918	I33	3032	N17	7603	O 4		
1961	O 8	3033	K 8	7604	N 4		
1962	O10	3034	K 8	7609	O 5		
2001	N14	3035	N17	9007	F27		
2002	M15	3036	N20	9013	I 7		
2003	N15	3045	M20	9034	M 7		
2004	M17	3046	N19	9073	N 8		
2005	M17	3047	C11	9154	O12		
2006	N19	3048	C10				
2007	O18	3050	M16				
2008	M18	3052	E22				
2009	O21	3054	M18				
2010	O22	3055	M19				
2011	N22	3134	C 5				
2012	K20	3135	D 5				
2013	N16	3160	O13				
2014	J20	3500	A26				
2015	J20	3501	A28				
2016	J20	3502	A28				
2017	I20	3503	B29				
2018	N18	3505	B31				
2019	H20	3509	E26				
2020	F21	3510	F26				
2021	F20	3512	D31				
2022	K21	3513	H30				
2023	B17	3514	I28				
2024	D11	3515	I28				
2025	B18	3516	H30				
2026	P17	3517	I28				
2027	D17	3518	N30				
2028	D17	3519	I 4				
2029	D16	3520	J30				
2030	A21	3521	K31				
2031	A22	3522	D32				
2032	C16	3523	F32				
2033	C15	3524	J31				
2034	A14	3525	K31				
2035	C13	3526	L30				
2036	N20	3527	N30				
2037	L20	3528	I 4				
2038	P16	3529	C32				
2039	E15	3530	I30				
2040	D15	3531	F27				
2041	D14	3532	F26				
2042	D14	3533	J31				
2043	D13	3534	M32				
2044	M14	3535	M30				
2045	D11	3536	N31				
2046	P13	3537	O28				
2047	C17	3538	N31				
2049	I 8	3539	N31				
2051	G 7	3540	O27				
2054	D20	3542	F31				
2055	N15	3543	F30				
2059	N 9	3544	G31				
2064	N19	3545	A31				
2066	P20	3546	A31				
2137	C 6	3547	A28				
2138	D 6	3560	I 3				
2501	I26	3561	I28				
2502	I27	3562	I27				
2503	N29	3563	I27				
2504	E31	3600	L 5				
2505	F31	3601	K 5				
2506	G31	3602	L 4				
2507	H32	3603	J 5				
2508	H28	3604	N 9				
2509	M31	3605	N11				
2510	M31	3606	N10				
2511	N32	3607	O12				
2512	O32	3608	N13				
2514	C29	3609	M13				
2515	A32	3610	N13				
2516	A32	3611	O12				
2517	A29	3612	M 4				
2519	I 5	3615	I 5				
2520	I 3	3618	N 8				
2521	I21	3619	O 5				
2523	D26	3620	N 6				
2524	D26	3622	M 6				
2525	D26	3623	O 4				
2526	C26	3624	N 3				
2527	C28	3625	N 3				
2528	O24	3626	O 3				
2530	A32	3627	P 3				
2600	O11	3638	O 6				
2601	M11	3655	M 9				
2602	M 5	3656	L 7				
2603	N12	3657	L 7				
2604	P12	5000	E20				
2605	O13	5001	B18				
2606	N14	5002	C16				
2607	M 4	5004	O18				
2608	K 5	5005	M18				
2617	N 3	5020	N18				
2618	N 7	5028	P16				
2619	N 4	5036	N20				
2620	O 6	5115	C27				
2621	N 6	5130	D 5				
2622	O 8	5601	L 8				
2647	K 8	5602	N 9				
2648	I 7	5603	O 7				
2650	K 5	5604	M 6				
2651	K 6	5605	N10				
2652	K 8	5831	A12				
2656	M 8	6135	D 6				
2657	L 8	6500	B31				
2831	B12	6501	C33				
3000	P14	6502	E32				
3001	P16	6509	J32				
3002	P19	6510	J32				
3003	P18	6511	L31				
3004	O19	6516	A31				
3005	N18	6530	M26				
3006	K 7	6601	K 6				
3007	O14	7000	O19				
3008	M21	7001	O16				
3009	O15	7002	L21				
3010	D21	7003	C20				
3011	P19	7004	O17				
3012	D20	7005	F22				
3013	L20	7006	O20				
3014	M20	7007	H10				
3015	D14	7008	E19				
3016	D13	7009	N21				
3017	B13	7011	N17				
3018	P17	7021	P14				
3019	D11	7500	A27				
3020	N16	7501	B27				
3021	D10	7502	A29				
3022	D 9	7505	D30				

Interconnections:

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OS page 3-23
PS page 3-14
QNIC page 3-25
VP/PD page 3-23
VS page 3-18
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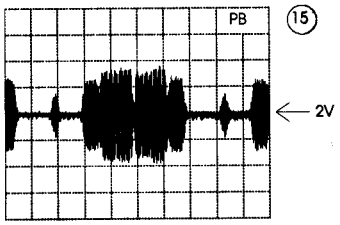
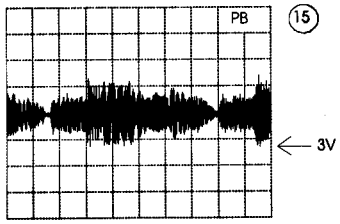
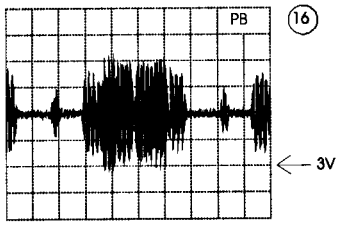


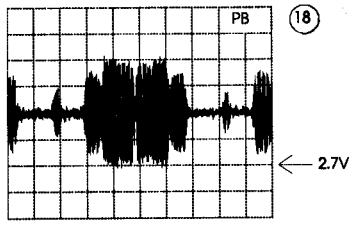
A: AC, 100mV/Div, 10us/Div
IC 7007 Pin 46 (PAL)



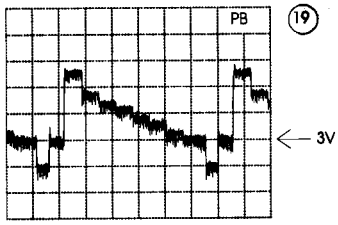
A: AC, 100mV/Div, 10us/Div
IC 7007 Pin 46 (SECAM L)



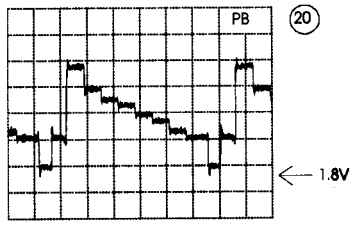
A: AC, 100mV/Div, 10us/Div
IC 7007 Pin 52



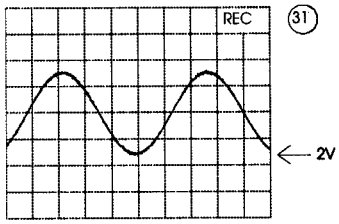
A: AC, 100mV/Div, 10us/Div
IC 7007 Pin 48/50



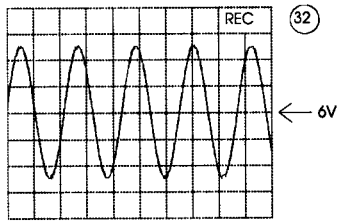
A: AC, 500mV/Div, 10us/Div
IC 7007 Pin 40



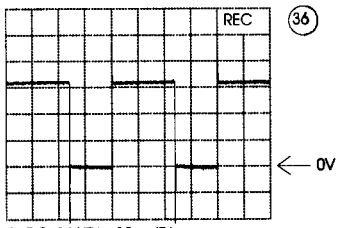
A: AC, 100mV/Div, 10us/Div
IC 7007 Pin 42



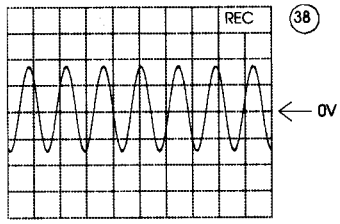
A: AC, 500mV/Div, 200us/Div
Modulator Pin 3



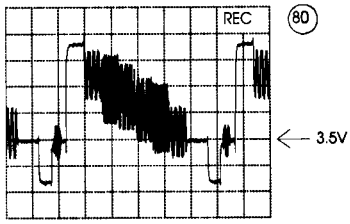
A: AC, 200mV/Div, 500us/Div
C 2503



A: DC, 1 V/Div, 10ms/Div
Connector 1961 Pin 7

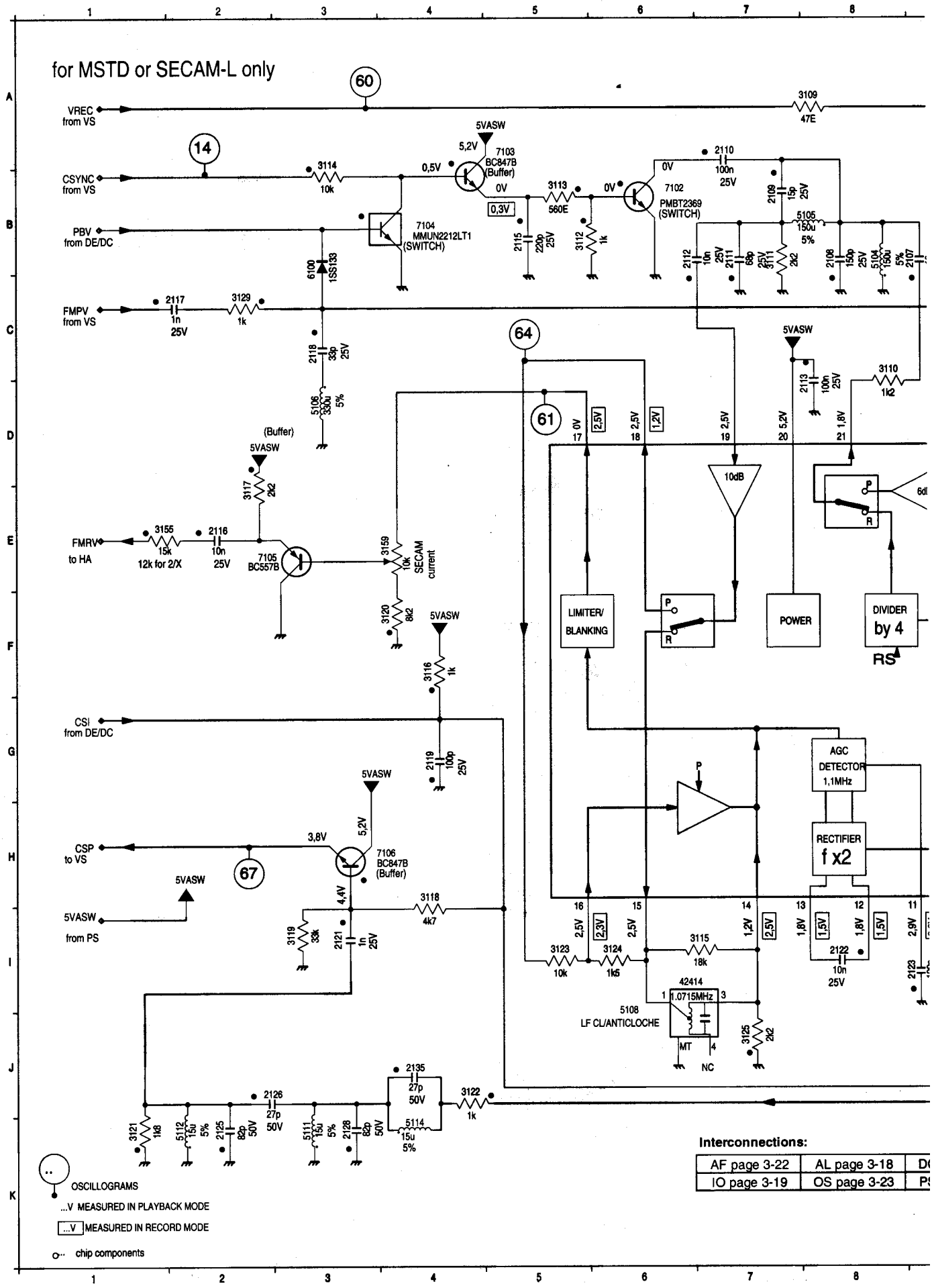


A: DC, 1 V/Div, 10us/Div
Connector 1951 Pin 1



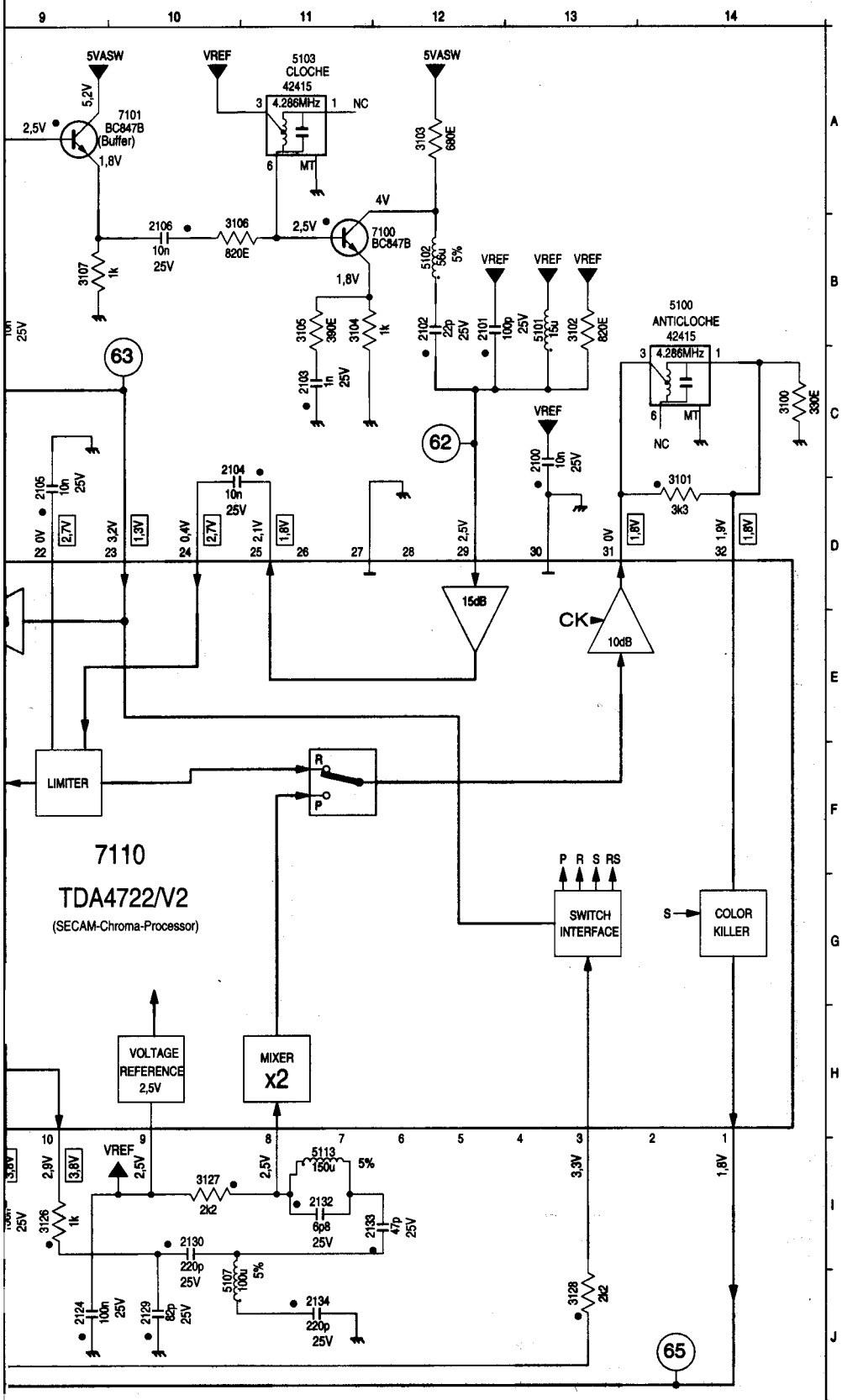
A: AC, 100mV/Div, 10us/Div
T 7500 Emitter

Video Signal Processing Secam (VS_S)



Interconnections:

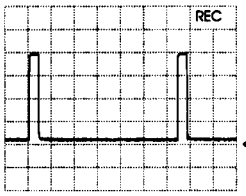
AF page 3-22	AL page 3-18	D
IO page 3-19	OS page 3-23	P



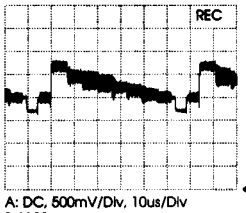
page 3-17	DE page 3-16	FM page 3-23	FV page 3-21	HA,HV page 3-15
page 3-14	QNIC page 3-25	VP/PD page 3-23	VS page 3-18	VS_S page 3-20

VS_S(40393)

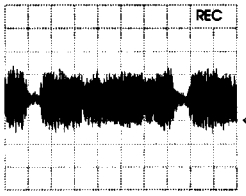
2100 C13
2101 B12
2102 B12
2103 C11
2104 C10
2105 D9
2106 B10
2107 B9
2108 B8
2109 B7
2110 A7
2111 B7
2112 B6
2113 D8
2115 B5
2116 E2
2117 C2
2118 C3
2119 G4
2121 I3
2122 I6
2123 I9
2124 J9
2125 K2
2126 J2
2128 K3
2129 J10
2130 I10
2132 I11
2133 I12
2134 J11
2135 J4
3100 C14
3101 D14
3102 B13
3103 A12
3104 B11
3105 B11
3106 B10
3107 B9
3109 A8
3110 C8
3111 B7
3112 B5
3113 B5
3114 A3
3115 I7
3116 F4
3117 E2
3118 H4
3119 I3
3120 F4
3121 K1
3122 J4
3123 I5
3124 I6
3125 J7
3126 I9
3127 I10
3128 J13
3129 C2
3155 E1
3159 E4
5100 B14
5101 B13
5102 B12
5103 A11
5104 B8
5105 B8
5106 D3
5107 J10
5108 J6
5111 K3
5112 K2
5113 I11
5114 K4
6100 B3
7100 B11
7101 A10
7102 B6
7103 A5
7104 B4
7105 E3
7106 H3
7110 F9



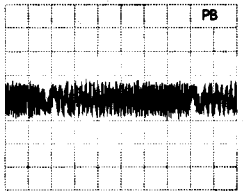
A: DC, 1 V/Div, 10us/Div
R 3114



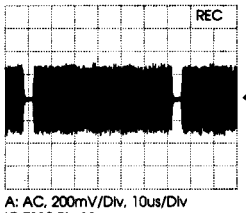
A: DC, 500mV/Div, 10us/Div
R 3109



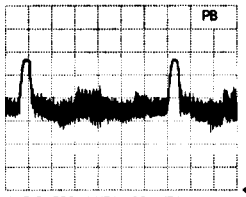
A: AC, 50mV/Div, 10us/Div
IC 7110 Pin 29



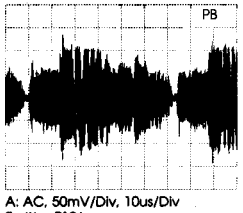
A: AC, 200mV/Div, 10us/Div
IC 7110 Pin 23



A: AC, 200mV/Div, 10us/Div
IC 7110 Pin 18

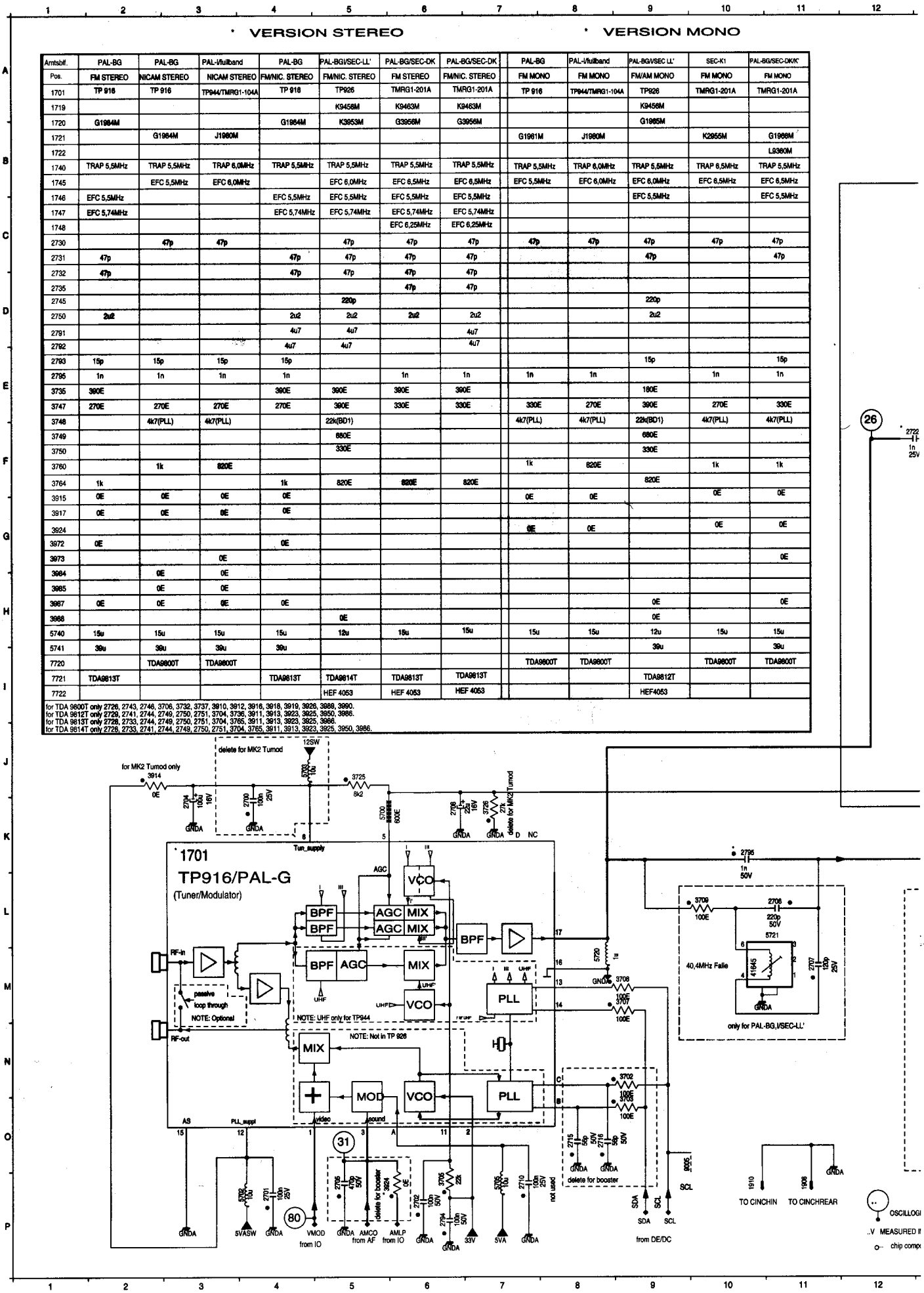


A: DC, 500mV/Div, 10us/Div
IC 7110 Pin 1



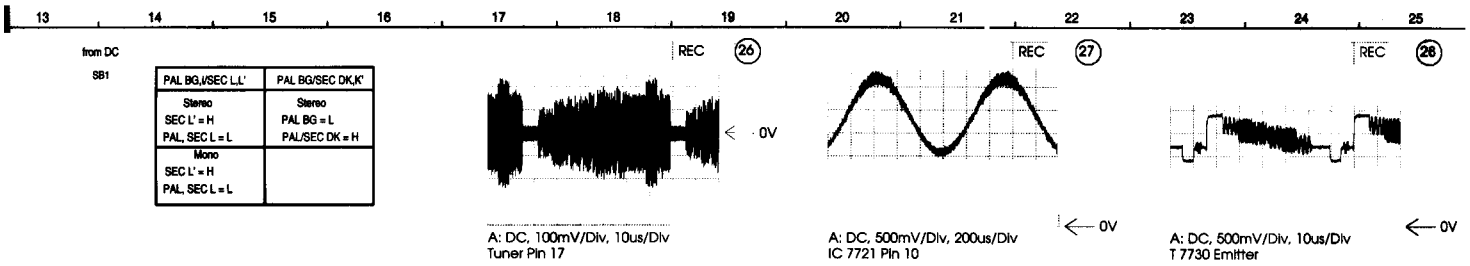
A: AC, 50mV/Div, 10us/Div
Emitter 7106

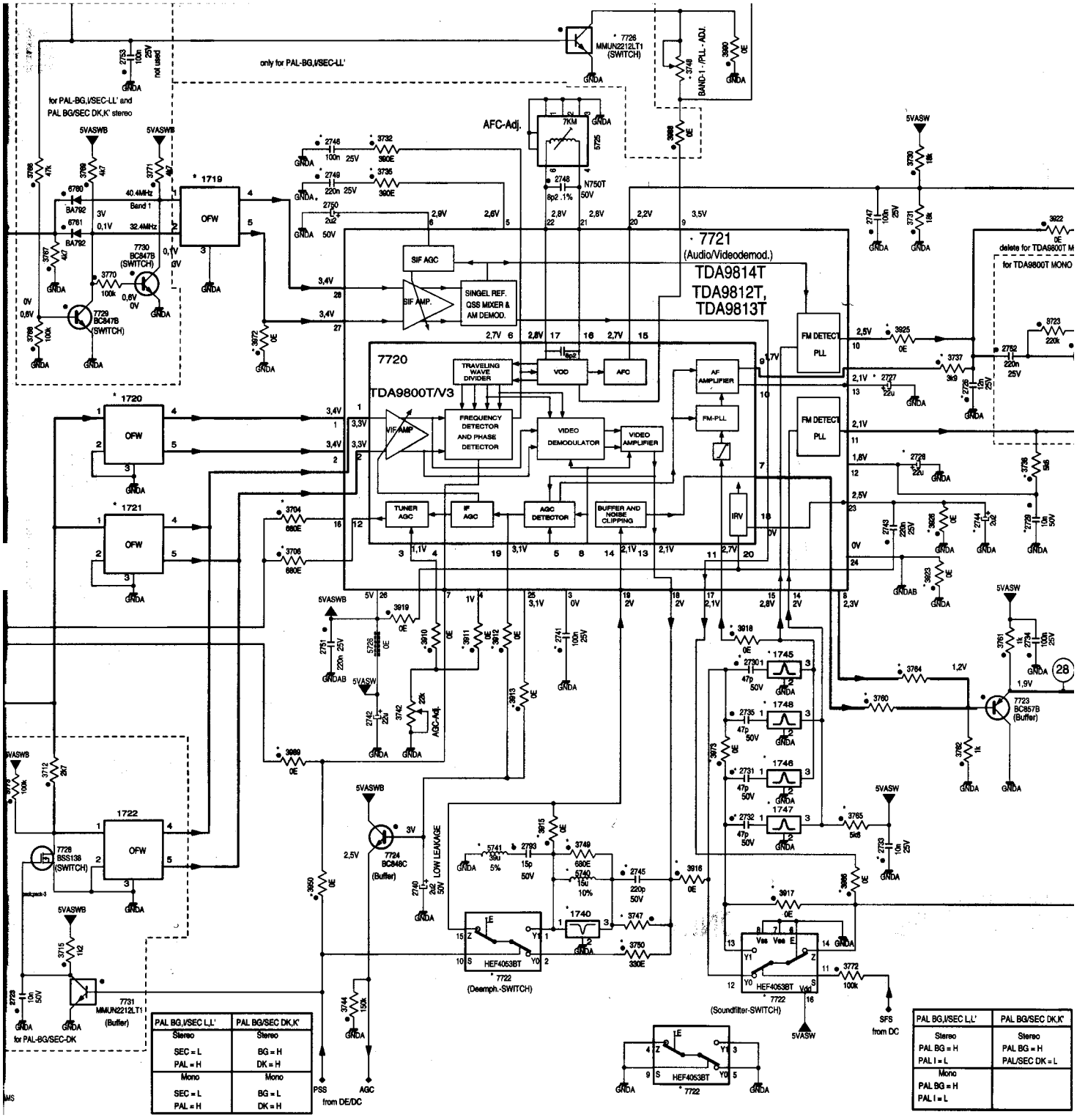
Frontend (FV)

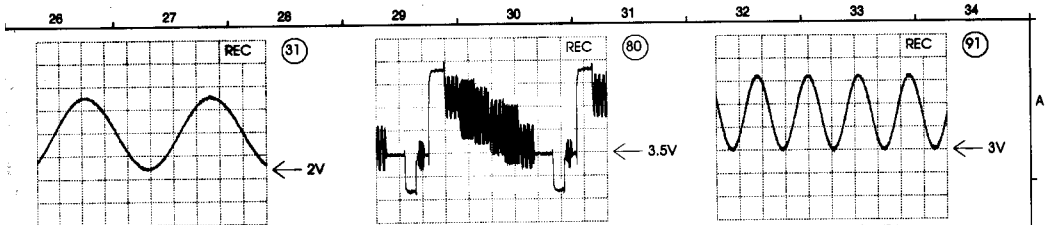


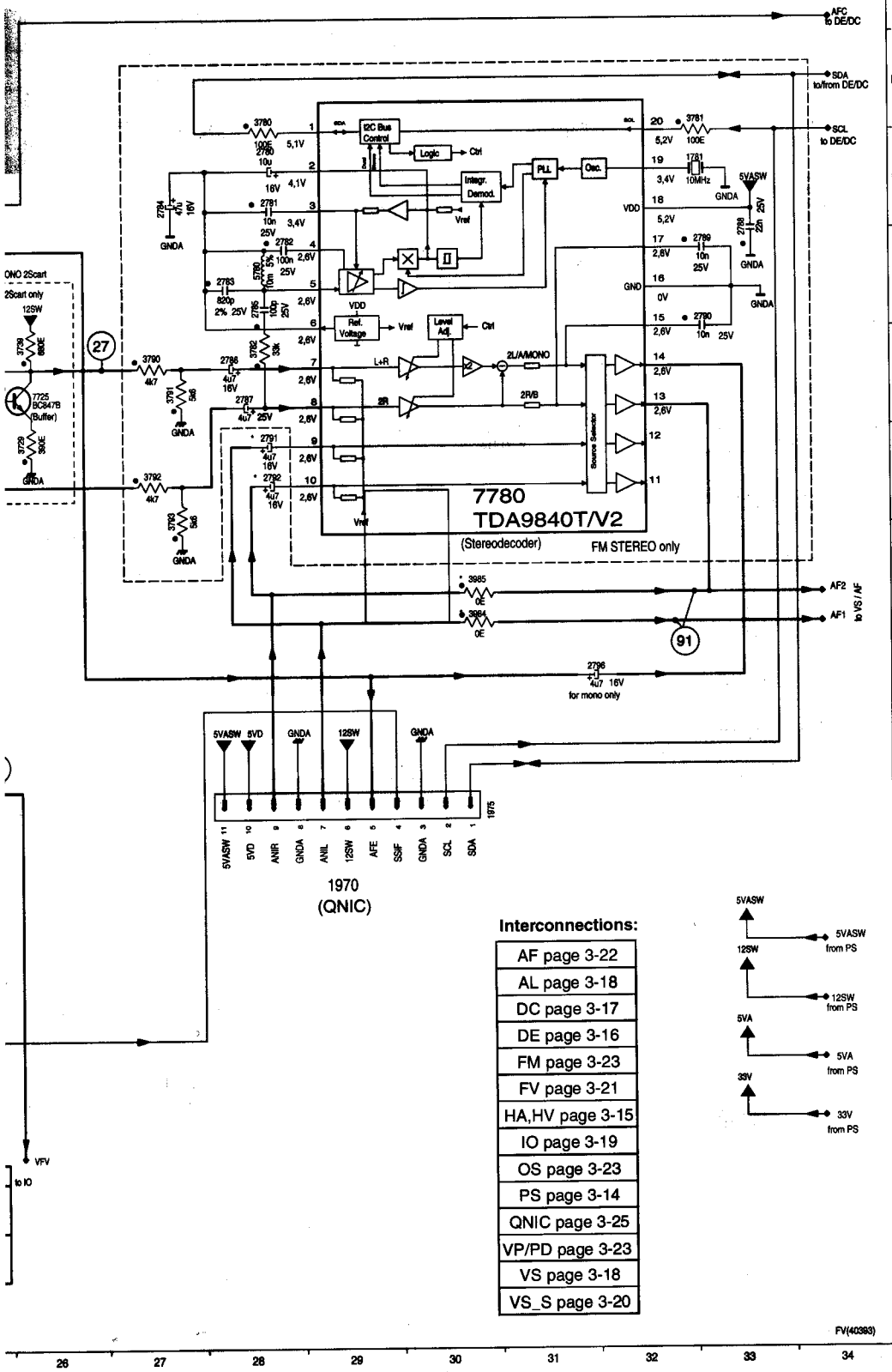
Amtsbif.	PAL-BG	PAL-BG	PAL-I/fullband	PAL-BG	PAL-BG/SEC-LL'	PAL-BG/SEC-DK	PAL-BG/SEC-DK	PAL-BG	PAL-I/fullband	PAL-BG/SEC LL'	SEC-K1	PAL-BG/SEC-DK/K'
Pos.	FM STEREO	NICAM STEREO	NICAM STEREO	FM/NIC. STEREO	FM/NIC. STEREO	FM STEREO	FM/NIC. STEREO	FM MONO	FM MONO	FM/AM MONO	FM MONO	FM MONO
1701	TP 916	TP 916	TP944/TMRG1-104A	TP 916	TP926	TMRG1-201A	TMRG1-201A	TP 916	TP944/TMRG1-104A	TP926	TMRG1-201A	TMRG1-201A
1719					K9456M	K9463M	K9463M			K9456M		
1720	G1984M			G1984M	K3953M	G3956M	G3956M			G1985M		
1721		G1984M	J1980M					G1961M	J1980M		K2955M	G1986M
1722												L9360M
1740	TRAP 5,5MHz	TRAP 5,5MHz	TRAP 6,0MHz	TRAP 5,5MHz	TRAP 5,5MHz	TRAP 5,5MHz	TRAP 5,5MHz	TRAP 5,5MHz	TRAP 6,0MHz	TRAP 5,5MHz	TRAP 6,5MHz	TRAP 5,5MHz
1745		EFC 5,5MHz	EFC 6,0MHz		EFC 6,0MHz	EFC 6,5MHz	EFC 6,5MHz	EFC 5,5MHz	EFC 6,0MHz	EFC 6,0MHz	EFC 6,5MHz	EFC 6,5MHz
1746	EFC 5,5MHz			EFC 5,5MHz	EFC 5,5MHz	EFC 5,5MHz	EFC 5,5MHz			EFC 5,5MHz		EFC 5,5MHz
1747	EFC 5,74MHz			EFC 5,74MHz	EFC 5,74MHz	EFC 5,74MHz	EFC 5,74MHz					
1748						EFC 6,25MHz	EFC 6,25MHz					
2730		47p	47p		47p	47p	47p	47p	47p	47p	47p	47p
2731	47p			47p	47p	47p	47p			47p		47p
2732	47p			47p	47p	47p	47p					
2735						47p	47p					
2745					220p					220p		
2750	2u2			2u2	2u2	2u2	2u2			2u2		
2791				4u7	4u7		4u7					
2792				4u7	4u7		4u7					
2793	15p	15p	15p	15p						15p		15p
2795	1n	1n	1n	1n		1n	1n	1n	1n		1n	1n
3735	390E			390E	390E	390E	390E			180E		
3747	270E	270E	270E	270E	390E	330E	330E	330E	270E	390E	270E	330E
3748		4k7(PLL)	4k7(PLL)		22k(BD1)			4k7(PLL)	4k7(PLL)	22k(BD1)	4k7(PLL)	4k7(PLL)
3749					680E					680E		
3750					330E					330E		
3760		1k	820E					1k	820E		1k	1k
3764	1k			1k	820E	820E	820E			820E		
3915	0E	0E	0E	0E				0E	0E		0E	0E
3917	0E	0E	0E	0E								
3924								0E	0E		0E	0E
3972	0E			0E								
3973			0E									0E
3984		0E	0E									
3985		0E	0E									
3987	0E	0E	0E	0E						0E		0E
3988					0E					0E		
5740	15u	15u	15u	15u	12u	15u	15u	15u	15u	12u	15u	15u
5741	39u	39u	39u	39u						39u		39u
7720		TDA9800T	TDA9800T					TDA9800T	TDA9800T		TDA9800T	TDA9800T
7721	TDA9813T			TDA9813T	TDA9814T	TDA9813T	TDA9813T			TDA9812T		
7722					HEF 4053	HEF 4053	HEF 4053			HEF4053		

for TDA 9800T only 2726, 2743, 2746, 3706, 3732, 3737, 3910, 3912, 3916, 3918, 3919, 3926, 3988, 3990.
for TDA 9812T only 2729, 2741, 2744, 2749, 2750, 2751, 3704, 3736, 3911, 3913, 3923, 3925, 3950, 3986.
for TDA 9813T only 2728, 2733, 2744, 2749, 2750, 2751, 3704, 3765, 3911, 3913, 3923, 3925, 3986.
for TDA 9814T only 2728, 2733, 2741, 2744, 2749, 2750, 2751, 3704, 3765, 3911, 3913, 3923, 3925, 3950, 3986.


13 14 15 16 17 18 19 20 21 22 23 24 25
from DC
SB1
PAL BG,I/SEC L,L'
PAL BG/SEC DK,K'
Stereo
SEC L' = H
PAL, SEC L = L
Mono
SEC L' = H
PAL, SEC L = L
Stereo
PAL BG = L
PAL/SEC DK = H
REC 26
0V
A: DC, 100mV/Div, 10us/Div
Tuner Pin 17
REC 27
0V
A: DC, 500mV/Div, 200us/Div
IC 7721 Pin 10
REC 28
0V
A: DC, 500mV/Div, 10us/Div
T 7730 Emitter

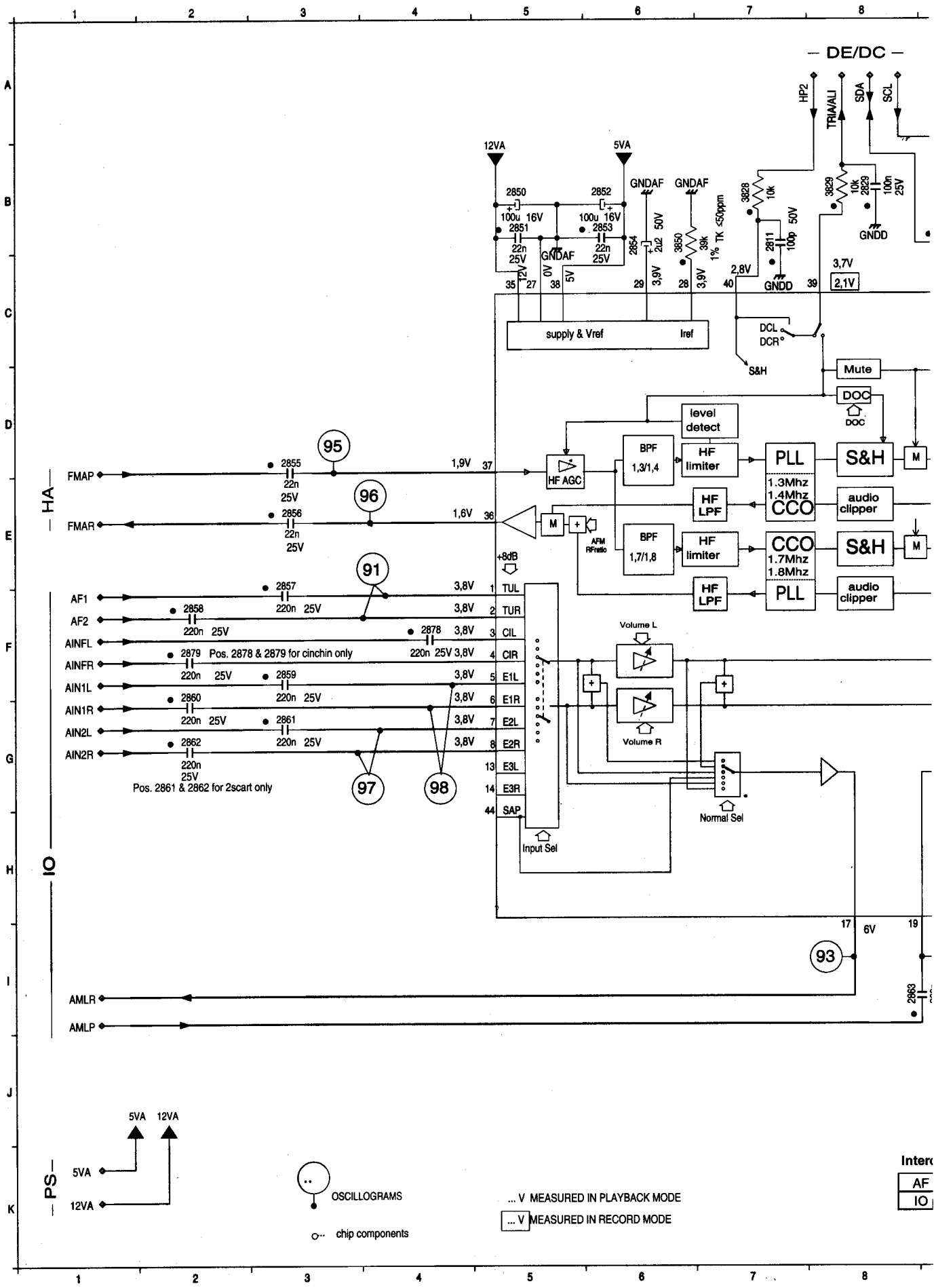

only for PAL-BG,I/SEC-LL'
for PAL-BG,I/SEC-LL' and
PAL BG/SEC DK,K' stereo
not used
AFC-Adj.
7721
(Audio/Videodemod.)
TDA9814T
TDA9812T,
TDA9813T
7720
TDA9800T/V3
SIF AGC
SIF AMP.
SINGEL REF.
QSS MIXER &
AM DEMOD.
TRAVELING
WAVE
DIVIDER
VCO
AFC
FREQUENCY
DETECTOR
AND PHASE
DETECTOR
VIF AMP
VIDEO
DEMODULATOR
VIDEO
AMPLIFIER
AF
AMPLIFIER
FM-PLL
FM DETECT
PLL
TUNER
AGC
IF
AGC
AGC
DETECTOR
BUFFER AND
NOISE
CLIPPING
IRV
OFW
1719
1720
1721
1722
MMUN2212LT1
(SWITCH)
BA792
BC847B
(SWITCH)
BSS138
(SWITCH)
BC848C
(Buffer)
BC857B
(Buffer)
HEF4053BT
7722
(Deemph.-SWITCH)
(Soundfilter-SWITCH)
LOW LEAKAGE
AGC-Adj.
delete for TDA9800T M
for TDA9800T MONO
for PAL-BG/SEC-DK
PSS
from DE/DC
AGC
SFS
from DC
5VASW
5VASWB
GNDA
GNDAB
PAL BG,I/SEC L,L'
PAL BG/SEC DK,K'
Stereo
SEC L = L
PAL = H
Mono
SEC = L
PAL = H
Stereo
BG = H
DK = H
Mono
BG = L
DK = H
PAL BG,I/SEC L,L'
PAL BG/SEC DK,K'
Stereo
PAL BG = H
PAL I = L
Mono
PAL BG = H
PAL I = L
Stereo
PAL BG = H
PAL/SEC DK = L

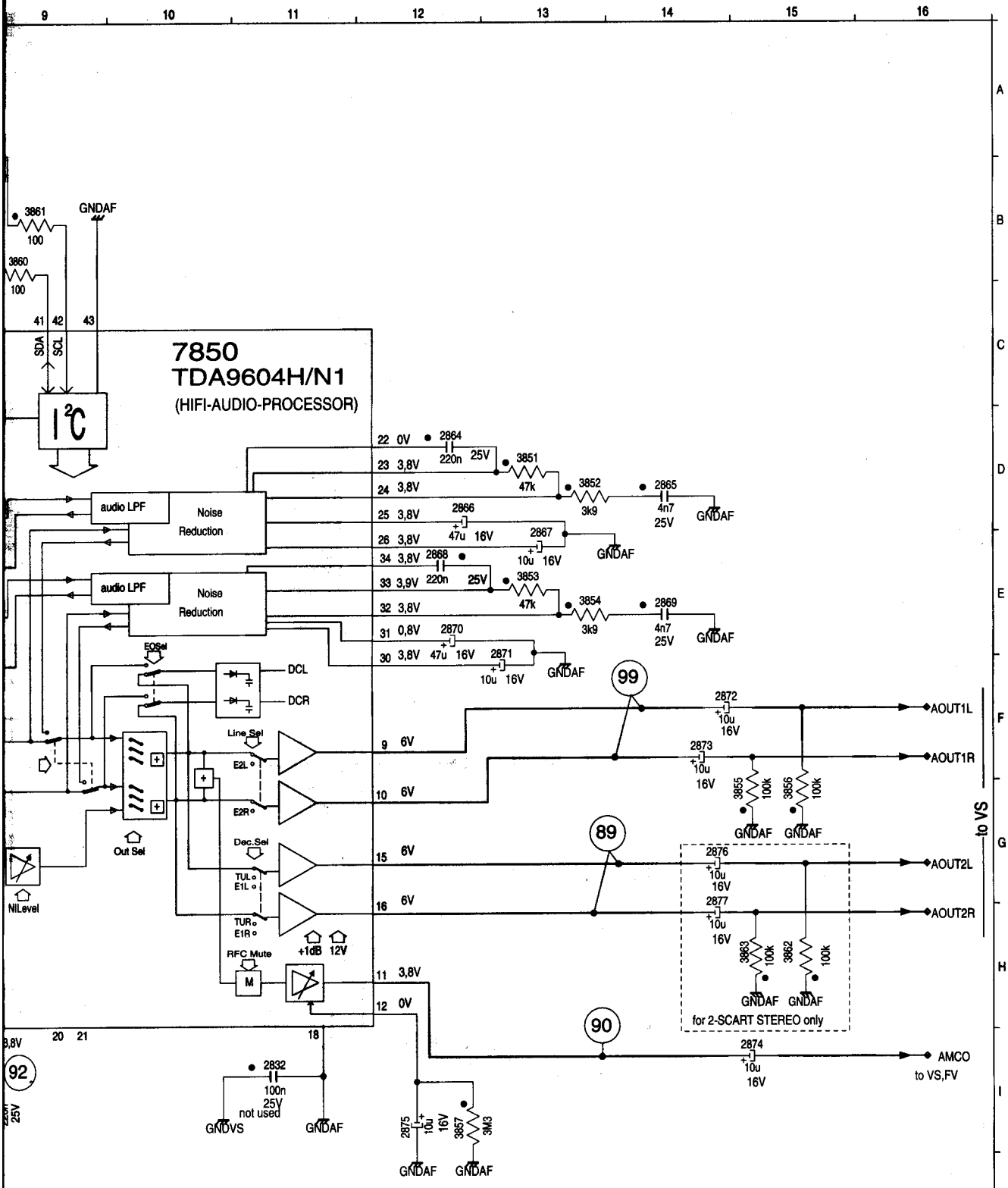




1701 K 3
1719 E15
1720 H14
1721 I14
1722 M14
1740 N19
1745 K22
1746 L22
1747 M22
1748 K22
1781 E33
1908 P11
1910 P10
1975 K30
2700 K 4
2701 P 4
2702 P 6
2704 K 3
2705 P 5
2706 L11
2707 M11
2708 K 6
2710 P 7
2715 O 8
2716 O 8
2722 F12
2723 O13
2726 H24
2727 G23
2728 H24
2729 I25
2730 K22
2731 L22
2732 M22
2733 M23
2734 K25
2735 K22
2740 N18
2741 K19
2742 L17
2743 I23
2744 I24
2745 M20
2746 E17
2747 F23
2748 E19
2749 E17
2750 E17
2751 K17
2752 G25
2753 D14
2780 E28
2781 E28
2782 F28
2783 F28
2784 E27
2785 F28
2786 G28
2787 G28
2788 E33
2789 F33
2790 F33
2791 H28
2792 H28
2793 M19
2794 P 6
2795 K10
2796 J31
3702 N 9
3703 O 9
3704 I16
3705 P 6
3706 J16
3707 M 9
3708 M 9
3709 L10
3712 L13
3715 N13
3723 G25
3725 J 5
3726 K 7
3729 H26
3730 E24
3731 F24
3732 E17
3735 E17
3736 H25
3737 G24
3739 G26
3742 K17
3744 O17
3747 N20
3748 D21
3749 M20
3750 N20
3760 K23
3761 K25
3762 L24
3764 K24
3765 M23
3766 E13
3767 F13
3768 G13
3769 E14
3770 F14
3771 E14
3772 O23
3773 L13
3780 D28
3781 D33
3782 G28
3790 G27
3791 G27
3792 H27
3793 H27
3910 K18
3911 K18
3912 K19
3913 K19
3914 J 2
3915 M19
3916 M21
3917 N22
3918 J22
3919 J17
3922 F25
3923 J24
3924 P 5
3925 G23
3926 I24
3950 N16
3972 G16
3973 L21
3984 I30
3985 I30
3986 M23
3988 E21
3989 L16
3990 D21
5700 K 5
5702 P 4
5703 J 4
5705 P 7
5720 M 8
5721 L10
5725 E20
5726 K17
5740 M20
5741 M19
5780 F28
6760 E14
6761 F14
7720 G17
7721 F21
7722 O22
7722 O19
7722 P21
7723 K25
7724 M17
7725 G26
7726 C20
7728 M13
7729 G14
7730 F14
7731 O14
7780 H30
9005 O 9

Audio FM Processing (AF)



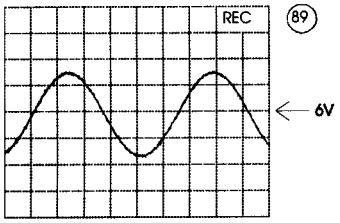


FOR STEREO ONLY

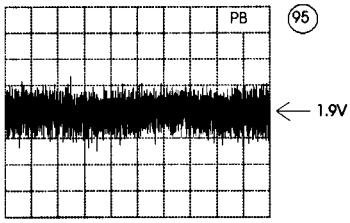
connections:

page 3-22	AL page 3-18	DC page 3-17	DE page 3-16	FM page 3-23	FV page 3-21	HA,HV page 3-15
page 3-19	OS page 3-23	PS page 3-14	QNIC page 3-25	VP/PD page 3-23	VS page 3-18	VS_S page 3-20

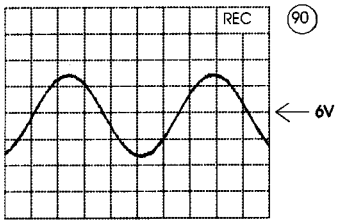
AF(40393)



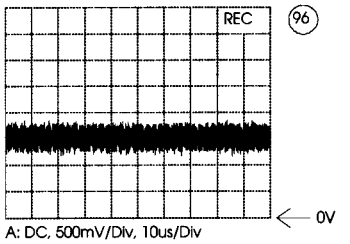
A: AC, 500mV/Div, 200us/Div
IC 7850 Pin 15, 16



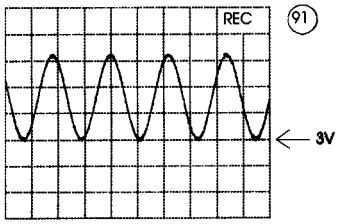
A: AC, 200mV/Div, 100us/Div
IC 7850 Pin 37



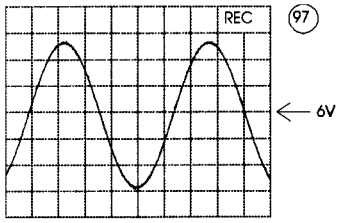
A: AC, 500mV/Div, 200us/Div
IC 7850 Pin 11



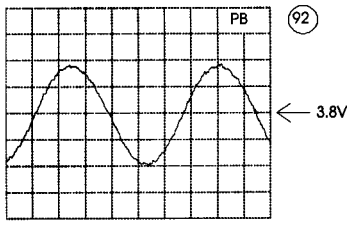
A: DC, 500mV/Div, 10us/Div
IC 7850 Pin 36



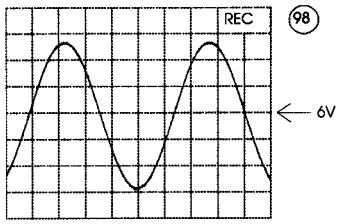
A: AC, 500mV/Div, 500us/Div
IC 7850 Pin 1, 2



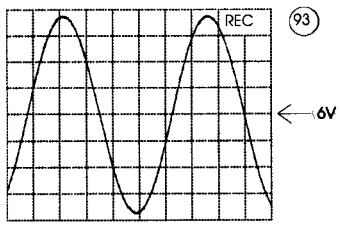
A: AC, 200mV/Div, 200us/Div
IC7850 Pin 7, 8



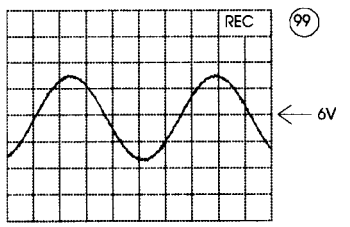
A: AC, 200mV/Div, 200us/Div
IC 7850 Pin 19



A: AC, 200mV/Div, 200us/Div
IC7850 Pin 5, 6

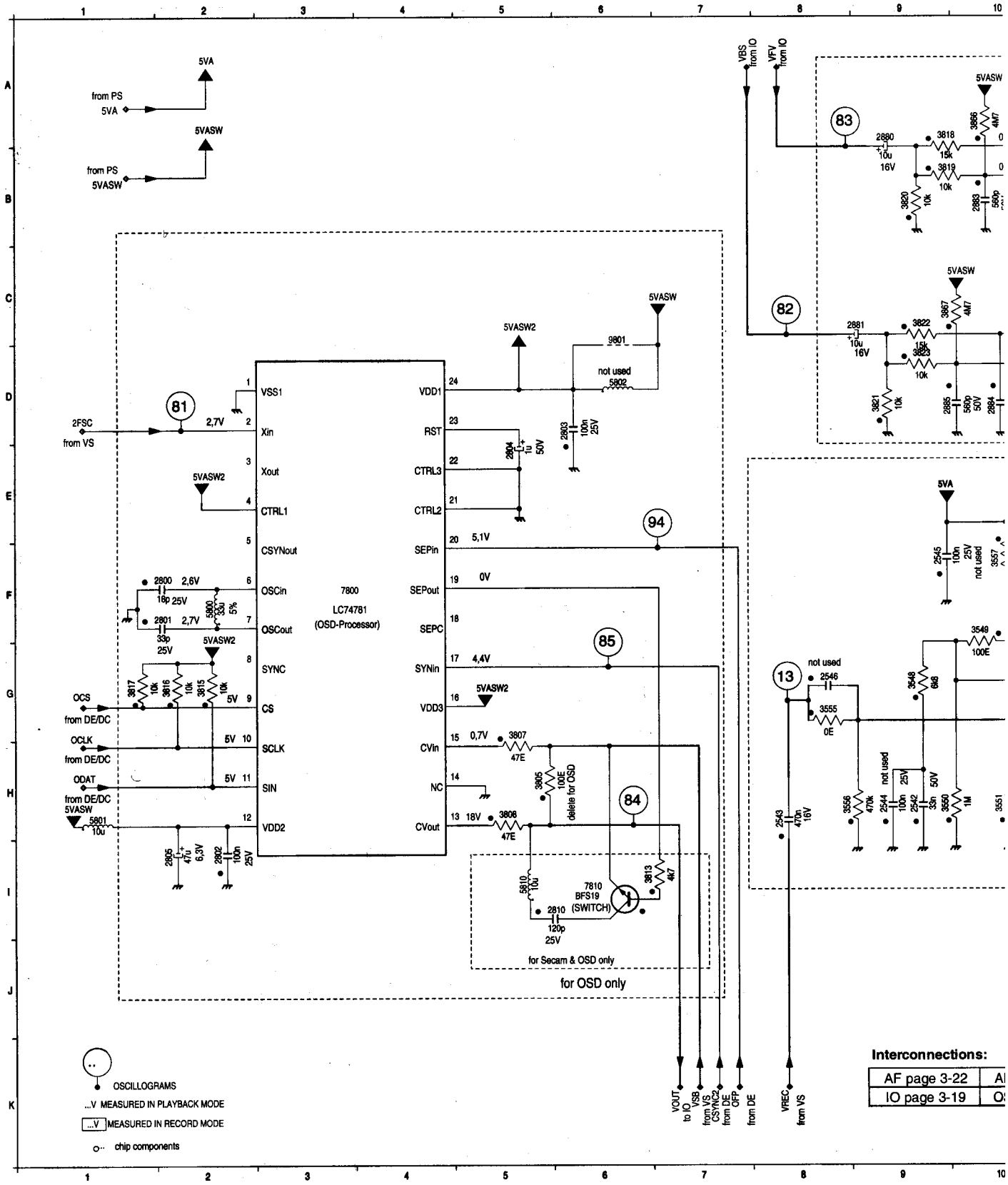


A: AC, 200mV/Div, 200us/Div
IC 7850 Pin 17



A: AC, 500mV/Div, 200us/Div
IC 7850 Pin 9, 10

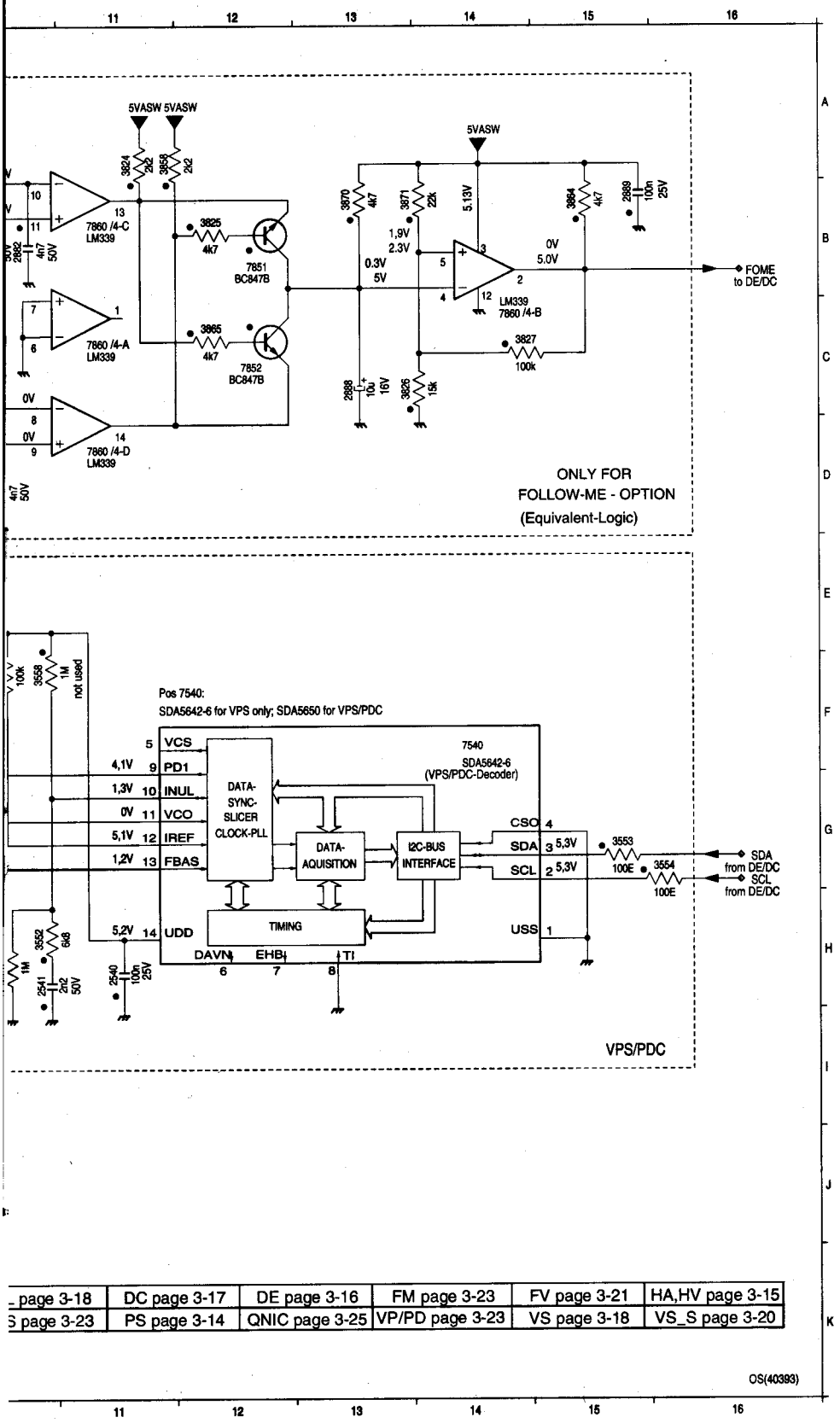
On Screen Display (OS), Follow Me (FM), Video Programming System / Programm Delivery (



Interconnections:

AF page 3-22	A
IO page 3-19	O

Control (VP/PD)



page 3-18	DC page 3-17	DE page 3-16	FM page 3-23	FV page 3-21	HA,HV page 3-15
S page 3-23	PS page 3-14	QNIC page 3-25	VP/PD page 3-23	VS page 3-18	VS_S page 3-20

OS(40393)

2540 H11
2541 H10
2542 H9
2543 H8
2544 H9
2545 F9
2546 G8
2800 F2
2801 F2
2802 I2
2803 D6
2804 E5
2805 I2
2810 I6
2880 A9
2881 C9
2882 B10
2883 B10
2884 D10
2885 D9
2888 C13
2889 B15
3548 G9
3549 F10
3550 H9
3551 H10
3552 H10
3553 G15
3554 G16
3555 G8
3556 H8
3557 F10
3558 F10
3805 H5
3807 G5
3808 H5
3813 I6
3815 G2
3816 G2
3817 G1
3818 A9
3819 B9
3820 B9
3821 D9
3822 C9
3823 D9
3824 A11
3825 B12
3826 C13
3827 C14
3858 A11
3864 B15
3865 C12
3866 A10
3867 C9
3870 B13
3871 B13
5800 F2
5801 H1
5802 D6
5810 I5
7540 F14
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7810 I6
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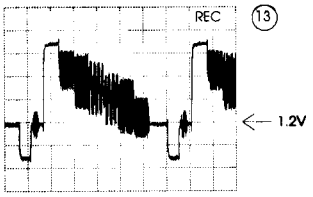
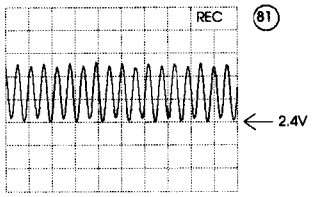
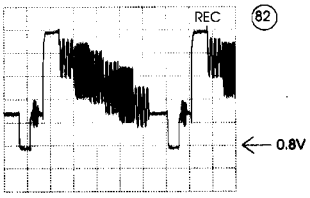
7860 C14
7860 C11
7860 D11
7860 B11
9801 C6



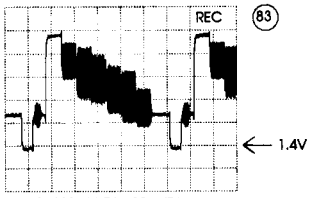
A: AC, 200mV/Div, 10us/Div
IC 7540 Pin 13



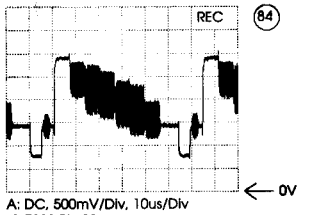
A: AC, 200mV/Div, 200ns/Div
IC 7800 Pin 2



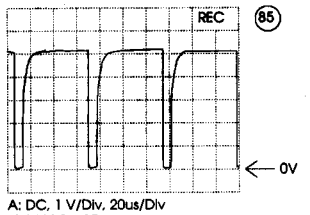
A: AC, 200mV/Div, 10us/Div
C 2881



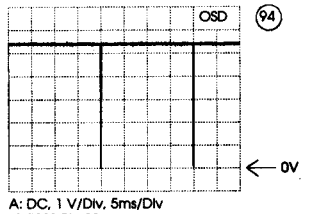
A: AC, 200mV/Div, 10us/Div
C 2880



A: DC, 500mV/Div, 10us/Div
IC 7800 Pin 13

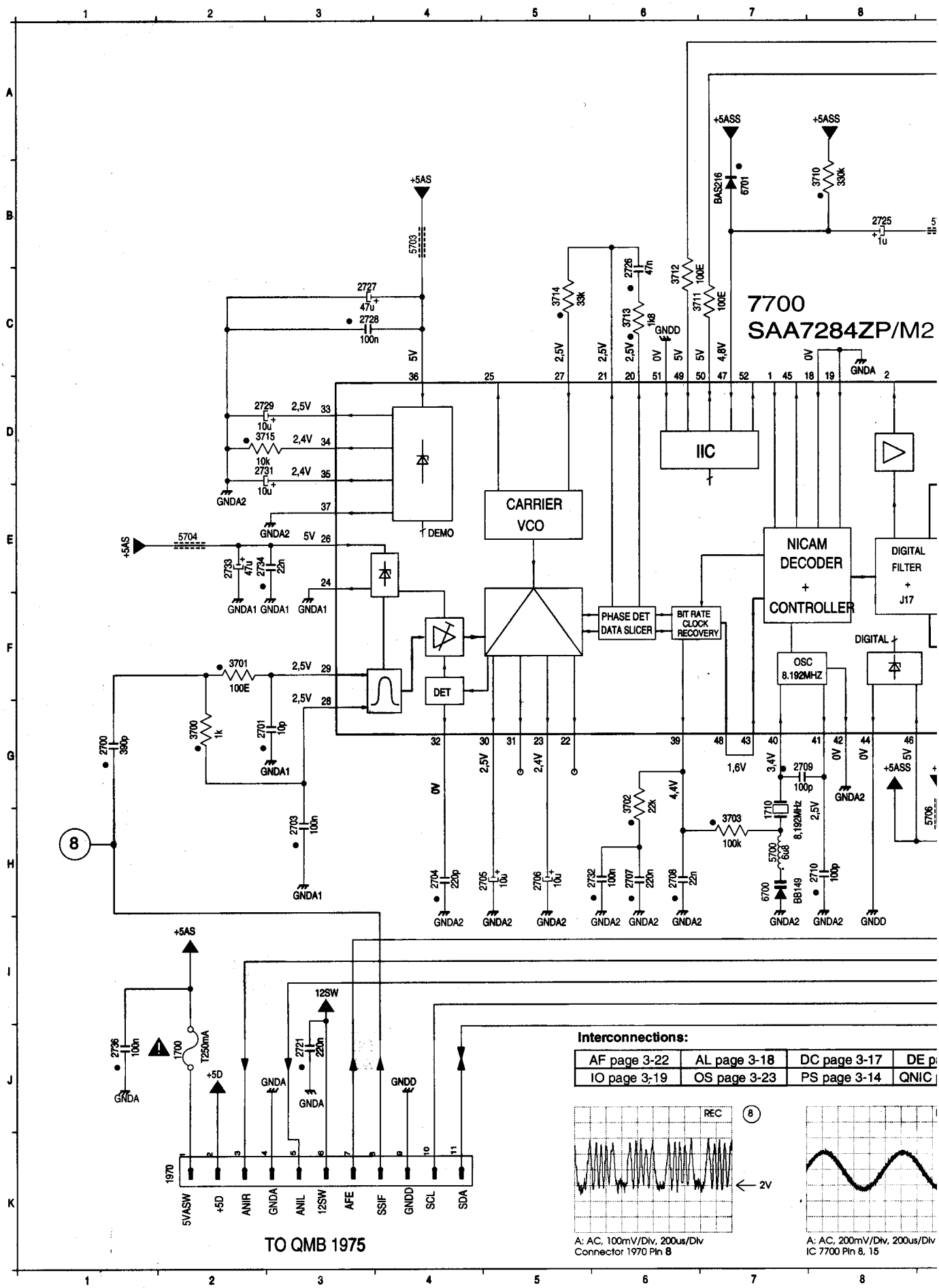


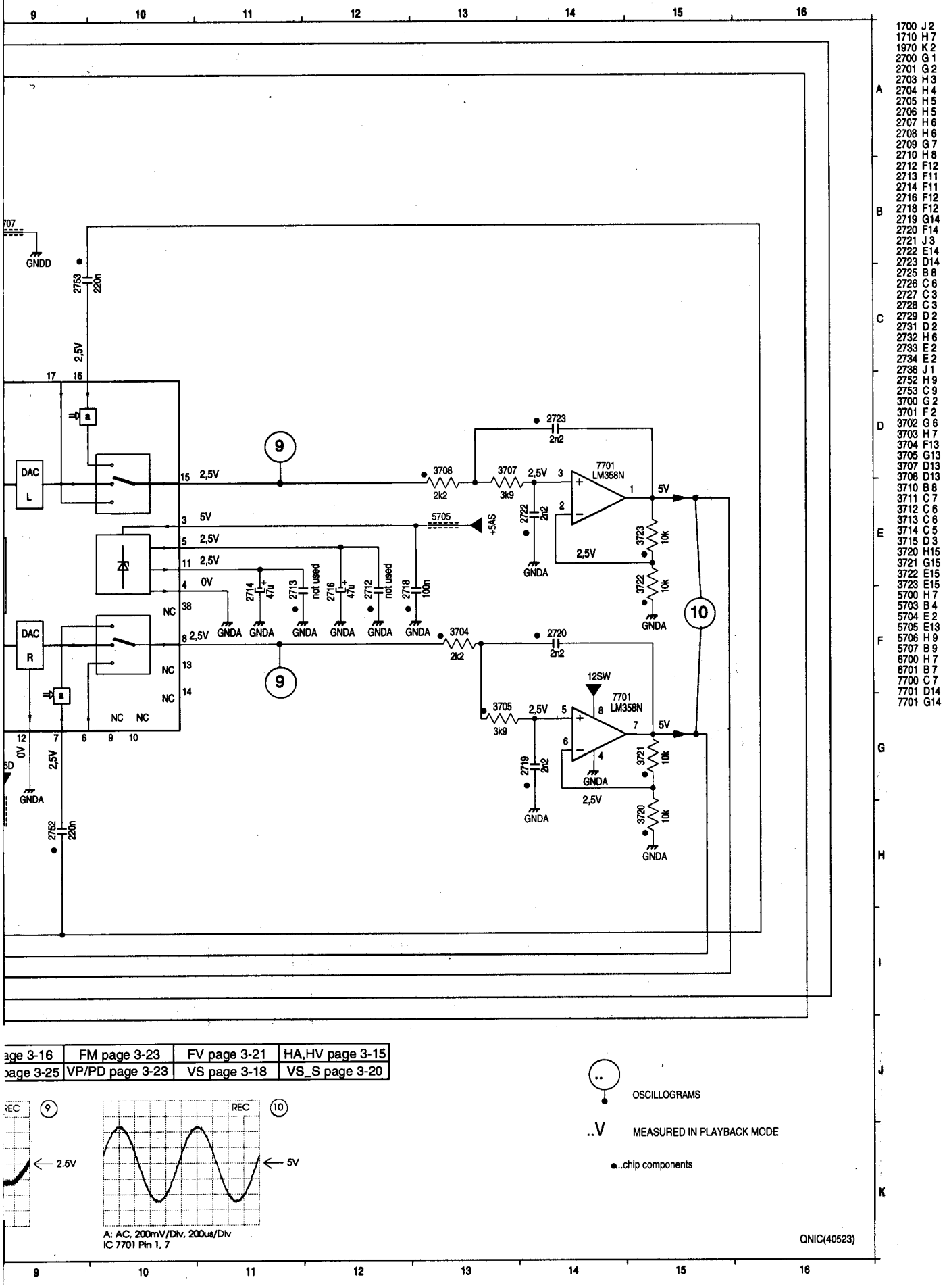
A: DC, 1 V/Div, 20us/Div
IC 7800 Pin 17



A: DC, 1 V/Div, 5ms/Div
IC 7800 Pin 20

Nicam Board (QNIC)





age 3-16	FM page 3-23	FV page 3-21	HA,HV page 3-15
page 3-25	VP/PD page 3-23	VS page 3-18	VS_S page 3-20

A: AC, 200mV/Div, 200us/Div
IC 7701 Pin 1, 7

OSCILLOGRAMS

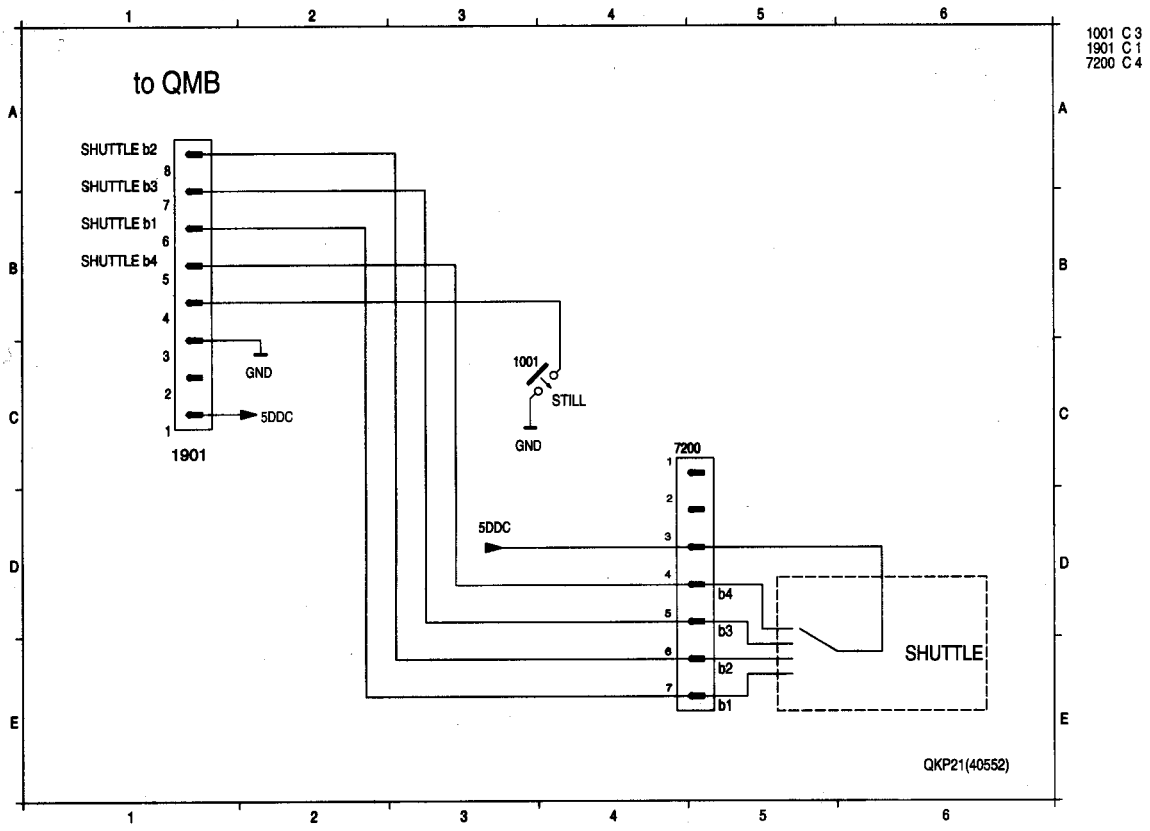
..V MEASURED IN PLAYBACK MODE

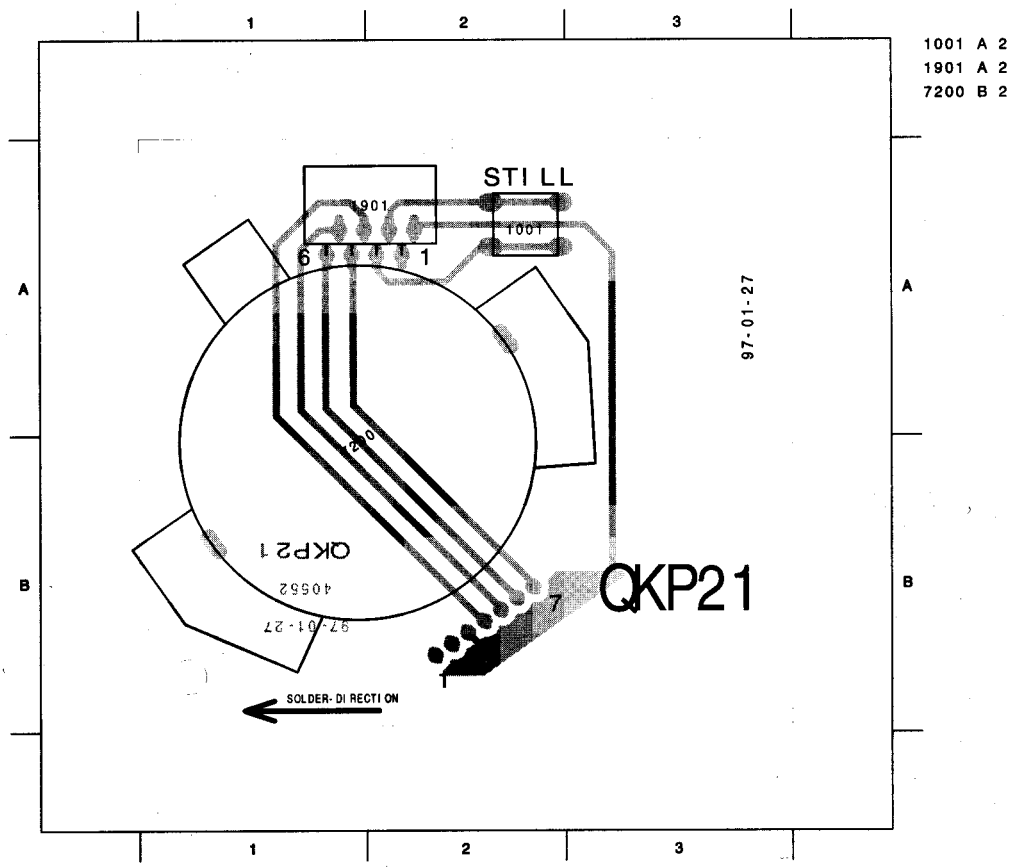
●...chip components

QNIC(40523)

1700 J 2
1710 H 7
1970 K 2
2700 G 1
2701 G 2
2703 H 3
2704 H 4
2705 H 5
2706 H 5
2707 H 6
2708 H 6
2709 G 7
2710 H 8
2712 F12
2713 F11
2714 F11
2716 F12
2718 F12
2719 G14
2720 F14
2721 J 3
2722 E14
2723 D14
2725 B 8
2726 C 6
2727 C 3
2728 C 3
2729 D 2
2731 D 2
2732 H 6
2733 E 2
2734 E 2
2736 J 1
2752 H 9
2753 C 9
3700 G 2
3701 F 2
3702 G 6
3703 H 7
3704 F13
3705 G13
3707 D13
3708 D13
3710 B 8
3711 C 7
3712 C 6
3713 C 6
3714 C 5
3715 D 3
3720 H15
3721 G15
3722 E15
3723 E15
5700 H 7
5703 B 4
5704 E 2
5705 E13
5706 H 9
5707 B 9
6700 H 7
6701 B 7
7700 C 7
7701 D14
7701 G14

Shuttle Board (QKP21)





4. DRIVE ASSEMBLY

This tape deck has three motors; one providing precision drive for the scanner unit; the second providing direct drive for the capstan and belt drive for the reel tables; the third motor drives the lift and tape threading/dethreading operations.

Special features are:

Quick start
Short winding time
Automatic cleaning of video heads by cleaning roller

To obtain a high repair standard we have developped a range of service kit's. These kit's covers the spare parts which are engaged together.
The tape deck's sensors are located on the motherboard underneath the tape deck, and included in its circuitry, lay out and parts list.

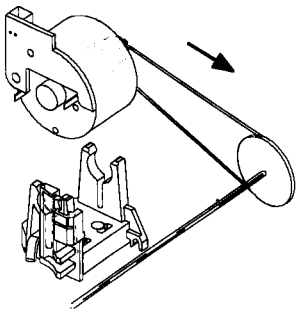
4.1 Deck parts replacement

The procedure for the removal and refitting of the following parts is described; only the lift, the scanner, the capstan motor and the A/C head are fixed by screws.
All the other deck assembly parts are held only by snap hooks.

For the replacement of parts on the underside of the tape deck, remove the tape deck from the motherboard.

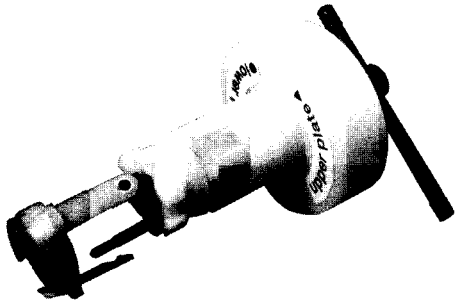
Manual extraction of cassette:
If, after the Eject button has been pressed, the drive does not unthread and eject the cassette, the dethreading/eject operation can also be carried out manually by turning the wheel at the rear of the threading motor.

fig. 1

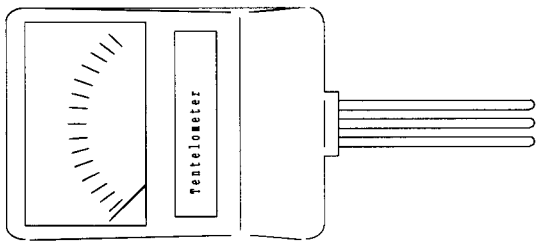


IMPORTANT:
After each repair has been carried out in the drive assembly, the first operation after repairing must be to bring the cassette compartment into „eject" position by hand.

Auxiliary tools for deck adjustment:

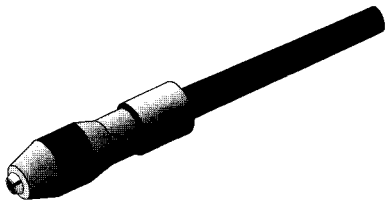


Tool for removing the head disc 4822 395 90977

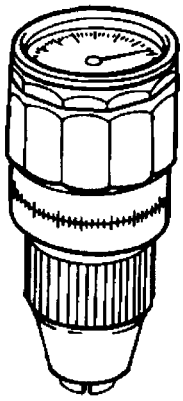


Tentelometer 4822 395 90584

Tool for tapetension adjustment 4822 395 50188



Handle 4822 256 90493



Torquemeter:

600 gf-cm 4822 395 90232
90 gf-cm 4822395 80196

Post adjustment screwdriver 4822 395 50275

Testcassette 4822 397 30103

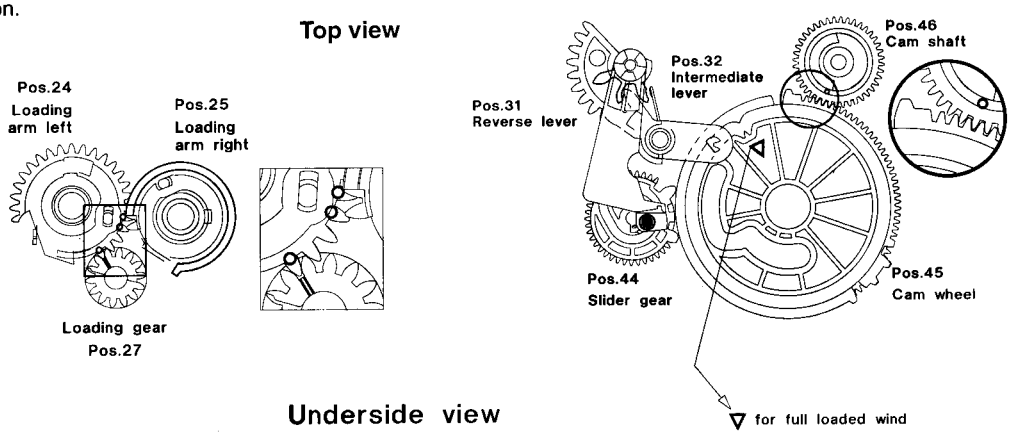
Nylon gloves 5322 395 94022

4.1.1 Deck lay out diagram

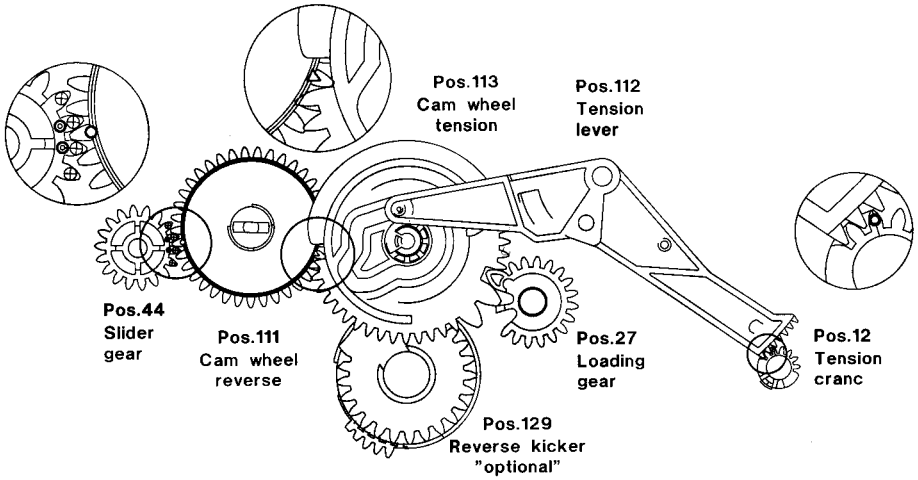
Deck in position „threaded out".

The following diagrams indicate the relative position of the gearwheels and levers when the deck is in the threaded out (cassette-compartment down) position.

Top view



Underside view



4.1.2 The Lift

Refitting the lift compartment:
Ensure the lift compartment is down and gear A is rotated one click stop anticlockwise from the down position.
The removal and refitting of the lift can be carried out in all deck positions with the exception of „eject" (ensure that gears 103/105 are free).

To remove the lift:
Free the holding bracket (Fig. 2) by rotating it up and back from the upper end.
Unscrew the 4 screws on the underside of the deck.
Carefully remove the lift vertically, noting the position of the record protect operating lever.

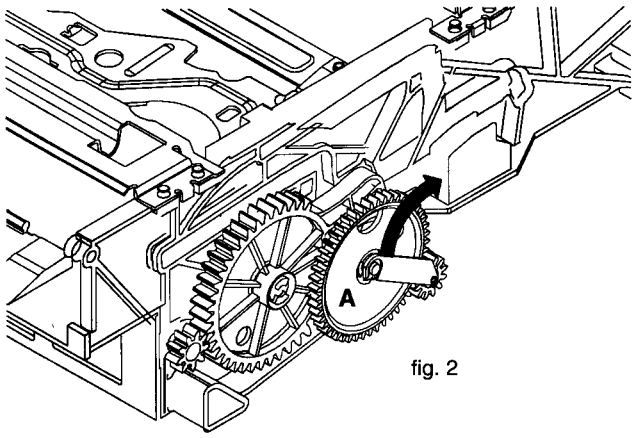


fig. 2

4.1.3 Head disc replacement

Removal :
Nylon gloves should be worn when handling the head disc.
Turn the headdisc until the long hole of the rotor appears in the bigger hole of the scannermotor
Insert the reference pin C (included with each service head disc) through the bigger hole of the lid of the scanner motor until the pin snaps in the long hole of the rotor. (Fig. 3)

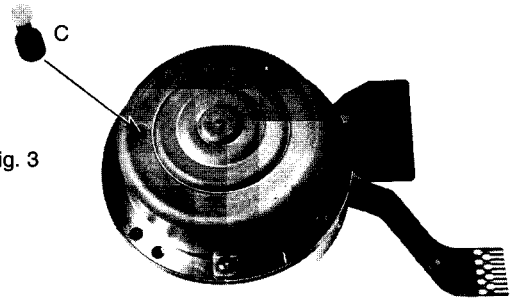
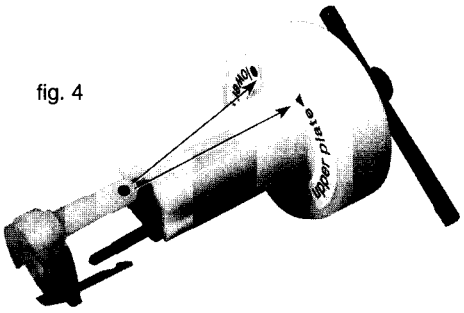


fig. 3

Important:
Choose Installation/Removal of the upper/lower clamping element by turning and attaching the reference element to the tool. (Fig. 4)

fig. 4



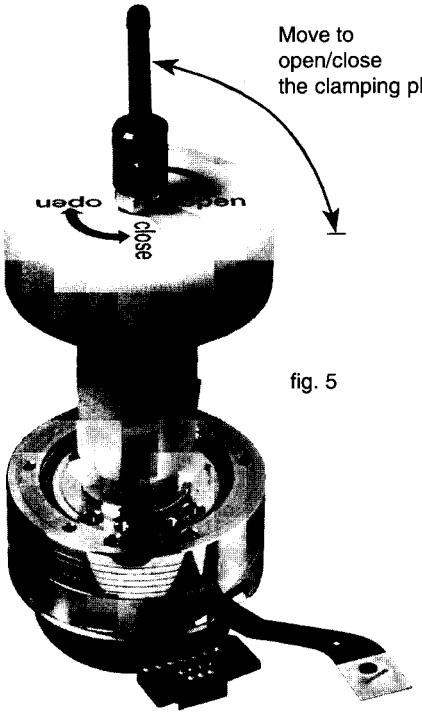


fig. 5

Position the tool on the upper clamping element, loosen the clamping element by turning the lever 90 degrees and remove it from the head disc. (Fig. 5)

Prepare the tool for the lower clamping element.Position the tool on the head disc and make sure that all 3 pins are snapped in the the lower clamping element. Loosen the clamping element by turning the lever 90 degrees and remove the head disc plus the tool from the scanner spindle. (Fig.6)

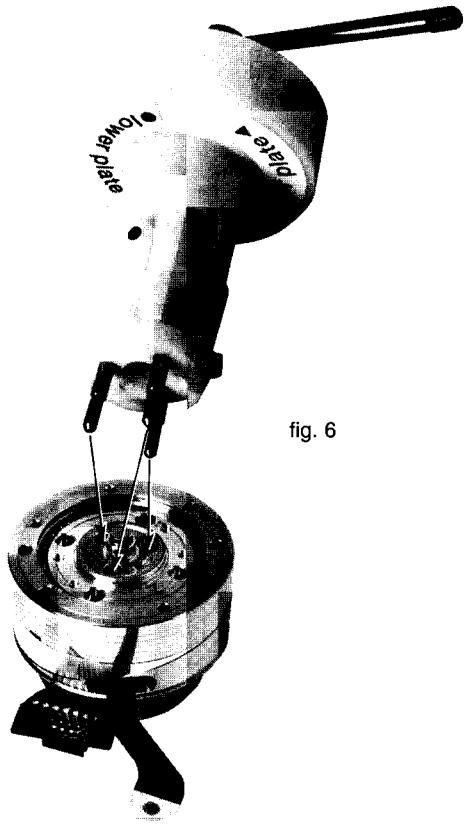


fig. 6

Installation:
Before carrying out the installation of the new head disc make sure that the scanner motor spindle is clean and undamaged. (The spindle has to be free of grease and must not be touched with bare hands)
Insert the 2 Mylar foils (included with each head disc) in the head disc. (Fig.7)

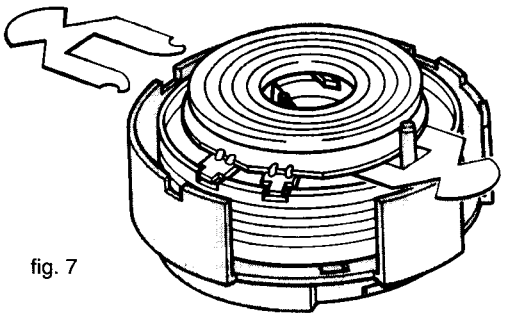


fig. 7

Position the tool (reference: lower clamping element) on the new headdisc (with protective cover) and loosen the lower clamping element.
Position the head disc so that pin D of the protective cover engages in the hole of the stator (the arrow on the protective cover must point towards the scanner print). (Fig. 8)

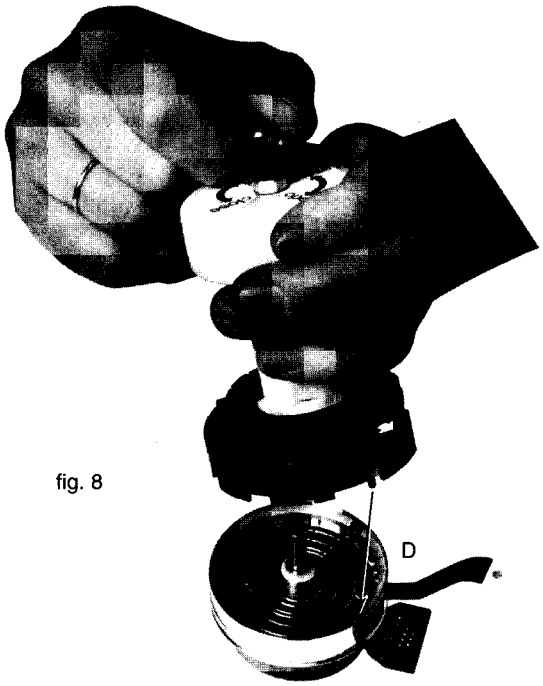


fig. 8

Reach the exact position through pressing the tool down with a force of 1 N. and fix the lower clamping element by turning the lever towards „close".
Remove the tool.
Change the tool to „upper clamping element" and position the clamping element exactly. (Fig. 9)

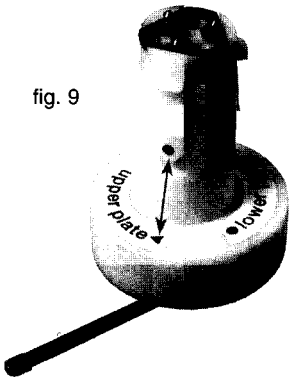


fig. 9

Tighten the clamping element through turning the lever towards „open". Position the tool planely on the head disc and fix the clamping element. (Fig.5 „close")
Remove the protecting cap from the head disc, withdraw the two Mylar foils and remove the reference pin C.

After replacing the head disc, carry out the following adjustments and checks :
Head switching pulse (gap position, chapter 3)
Write current adjustments (chapter 3)
Check tape path alignment (see paragraph 4.2.1.)

4.1.4 A/C Head (Combi head) (Pos. 36)

Remove the fixing spring (A) (fig. 10)
Remove the fixing screw and replace the A/C head.
Use a new fixing spring (included with new A/Chead) for reassembly.

After the A/C head has been replaced, all adjustments described in paragraph 4.2.1.2 and paragraph 4.2.2 have to be carried out.

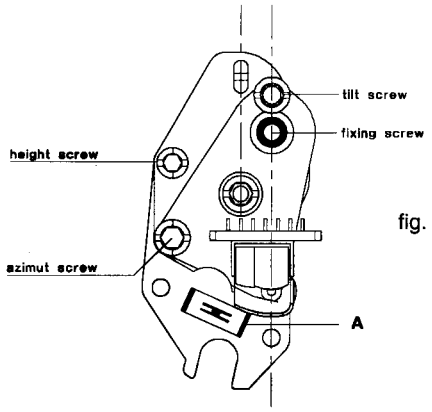


fig. 10

4.1.5 Threading motor (Pos. 38)

Remove the belt and disconnect the connector plug.
Remove the threading motor from the motor supports (Fig. 11).

During reassembly ensure that the threading motor is correctly located in the front and rear supports.

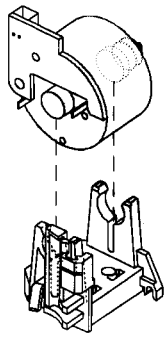


fig. 11

4.1.6 Capstan motor (Pos. 127)

Remove the tape deck.
Remove the belt (pos.126) on the underside;
Remove the three capstan motor fixing screws (Fig. 12) and withdraw the capstan motor downward from the drive assy.
The reassembly is carried out in reverse order. Make sure that the capstan is free of grease.

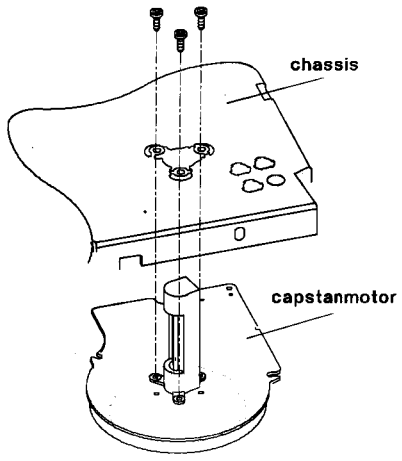


fig. 12

4.1.7 Pressure roller (Pos. 37)

Remove the tape deck
Unhook and remove the pressure roller tension spring.
Release the pressure roller guide (pos. 41) from the guide in the threading motor holder by pressing the top of the motor guide rearwards and rotating the pressure roller guide assembly clockwise by approximately a quarter of a turn (Fig. 13) The pressure roller and guide can now be lifted clear.

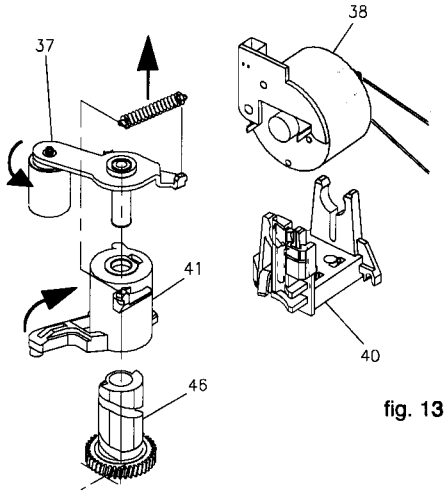
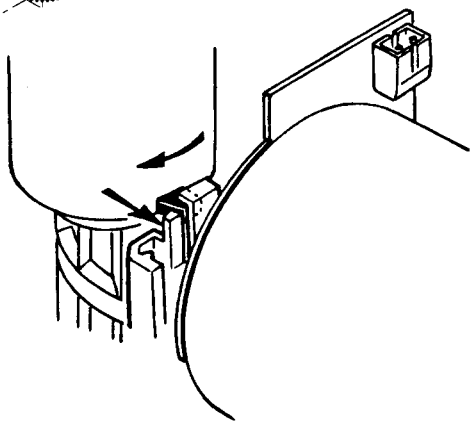


fig. 13



Ensure that no grease from the pressure roller guide gets to the capstan or pressure roller.
The reassembly is carried out in reverse order.

4.1.8 Roller unit right (Pos. 26)

Remove the tape deck.
Compress the two snap hooks by means of a pair of tweezers and remove the roller assy from the roller unit right (Fig. 14).
Unhinge the loading arm right from the holding plate and push the latter towards the front of the deck to remove from the guide (right).

NOTE: During reassembly ensure the link from 25 is engaged in the hole of the holder plate 26.
After replacing the roller unit (right), the tape path has to be checked, and adjusted if necessary (paragraph 4.2.1).

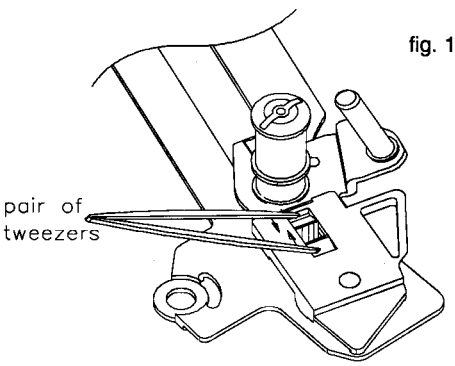


fig. 10

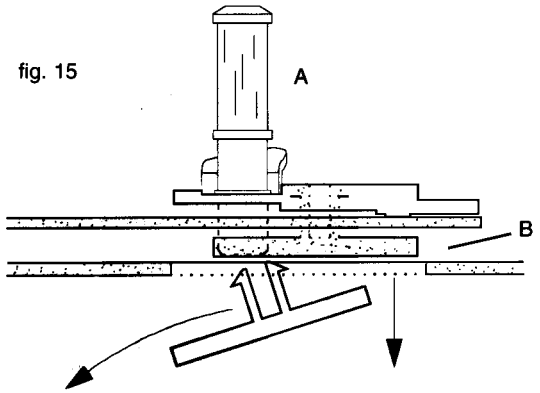
4.1.9 Roller unit left (Pos.23)

Set the drive assy to „Eject" position.
Unhook the tension arm spring (pos. 11), to avoid the tension arm spring being pre-loaded.
At the bottom side of the drive assy remove the tension lever (pos.112).
Compress the two snap hooks by means of a pair of tweezers (Fig. 9)and remove the roller assy (A) from the plate (B).
Unhinge the loading arm (left) from the holding plate and remove the latter downward from the drive assy through the recess in the chassis (Fig. 15).
The reassembly is carried out in reverse order.

NOTE : During reassembly
1. Place the carriage holding plate in the assembly with the half-round cutout nearest the rear of the deck.
2. When the loading arm is refitted ensure the pin on the underside of 23 is through the link of 24B.

After replacing the roller unit (left) the tape path has to be checked (paragraph 4.2.1.), and adjusted if necessary.

fig. 15

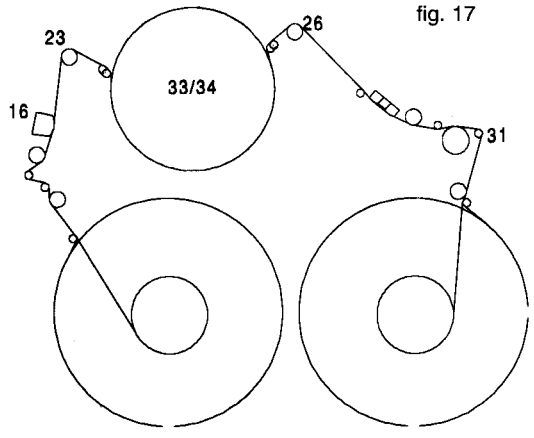


4.2 Adjustments

Adjustments must not be made in the service position.

4.2.1 Tape path

fig. 17



4.2.1.1 Roller left unit/roller unit right

Preparation:
Connect one input of a dual trace oscilloscope to observe the tape sync pulse CTL (pos.7460 IC SAA1310 pin16). The other input (DC coupled) to observe the tracking information TRIV.
Trigger the oscilloscope externally on the head pulse HP1 ("SWIN").
Playback the black and white section of the alignment test tape.
Set the deck in the condition where the video heads are running along the upper edge of the tracks only by:

1. Call the service test program (chapter 2.1)
2. Activate manual tracking (service test program step 03) and watch the tape sync pulse move to the left in relation to the TRIV signal.
3. Note the extreme left hand position reached by the sync pulse, repeat as necessary.
4. Stop the movement of the pulse when the TRIV signal reduces to 1/2 to 2/3 maximum amplitude by pressing the normal play button. A noisy picture (disturbances) is visible on the TV set and the CTL pulse should be to the left of the display.
The recorder will hold this position until the service test progam step 03 is left.
This condition works only if X-distance is adjusted.

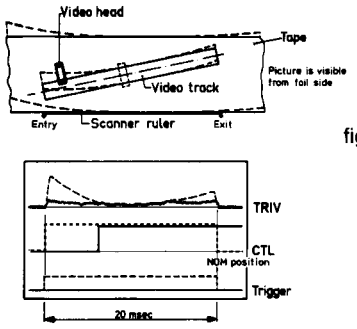


fig. 18

Adjustment:
Adjust the left and right roller units to make the tracking signal TRIV straight and flat as possible (Fig. 18).

4.2.1.2 A/C Combi head

Tilt angle adjustment

Set the drive to feature mode (e.g. +7)
Adjustment :
By means of the tilt angle adjusting screw move the tape until the lower edge just touches the tape guide A1 (see Fig. 19) the tape must not be distorted at the lower edge (by pressing onto guide).

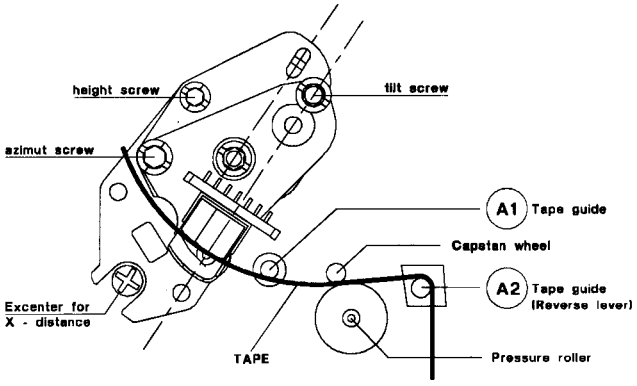


fig.19

Adjustment of the azimuth angle and the head height

Connect an oscilloscope to the linear Audio output.
Play the section of the test cassette with the audio signal 400 Hz.
Adjust for maximum output voltage by means of the height adjustment screw
Play the section of the test cassette with the audio signal 8 kHz.
Adjust to maximum output voltage by means of the azimuth adjustment screw (Fig. 19).
If necessary, repeat this procedure
Check the tilt angle adjustment

If the tape path was completely out of adjustment or if several components in the tape path have been replaced, it is possible, that the adjustments described in paragraph 4.2.1.1 and paragraph 4.2.1.2 have to be repeated several times.

4.2.2 Adjustment of the horizontal distance (x-distance)

Before this adjustment is carried out, insert the test cassette (start from Eject position). Call the service test program (tracking value will take up its nominal position) and press the „play" button.
Playback the black/white part of the test cassette.)
Display the TRIV signal on an oscilloscope (DC-coupled) and adjust for maximum voltage by means of the excentric screw (Fig.19).

4.2.3 Brake band and tape tension

Due to further development it is no longer necessary to make theseadjustments after replacement of the brake band.
If the brake band or tape tension are completely misadjusted, set them to a center position; set the drive to „play" and adjust the brake band until the edge of the elbow of the tape tension arm is aligned with the left inner edge of the left guide (fig. 20).

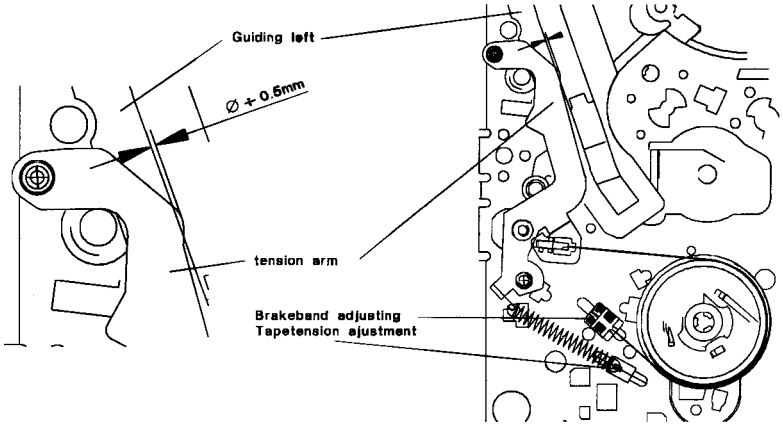
4.2.4 Friction clutch control check

Set the drive to „Play" position.
Place the torquemeter on the right reel.
Turn the capstan motor to move the right reel clockwise.
Keep turning, until the indication at the torquemeter no longer changes (Fig. 21)
The torque has to be 10,5 mNm +/-25% (105gFcm +/-25%)

4.2.5 Reverse brake control

Set the drive to „Reverse" position.
Place a torquemeter on the right reel and turn the latter counterclockwise, until the reel just starts to flip.
The value indicated at the torquemeter has to be 7mNm +/-3mNm (70 gFcm +/-30gFcm) (Fig. 21).

fig. 20



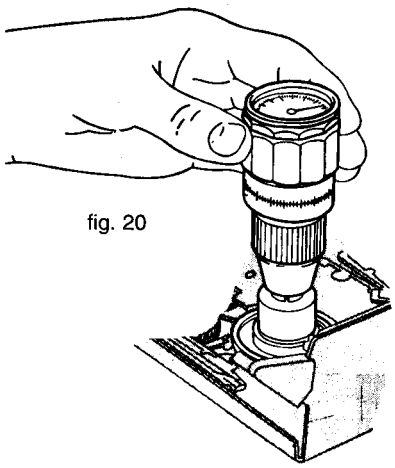
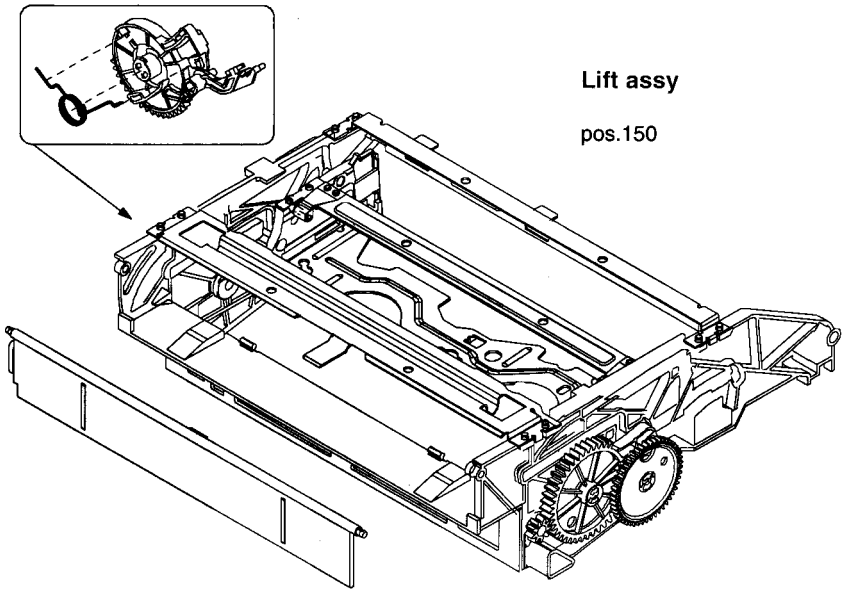


fig. 20

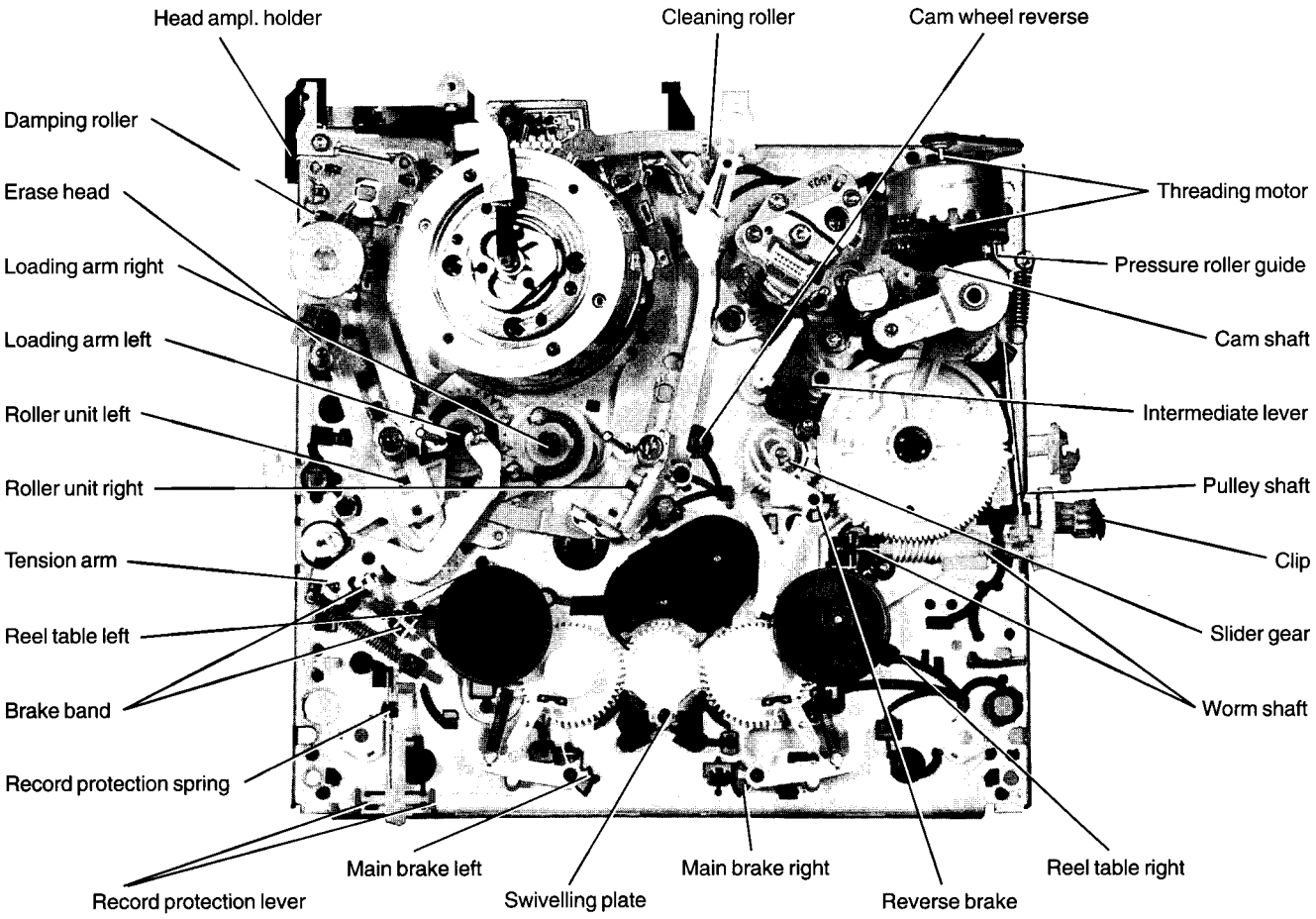


Lift assy

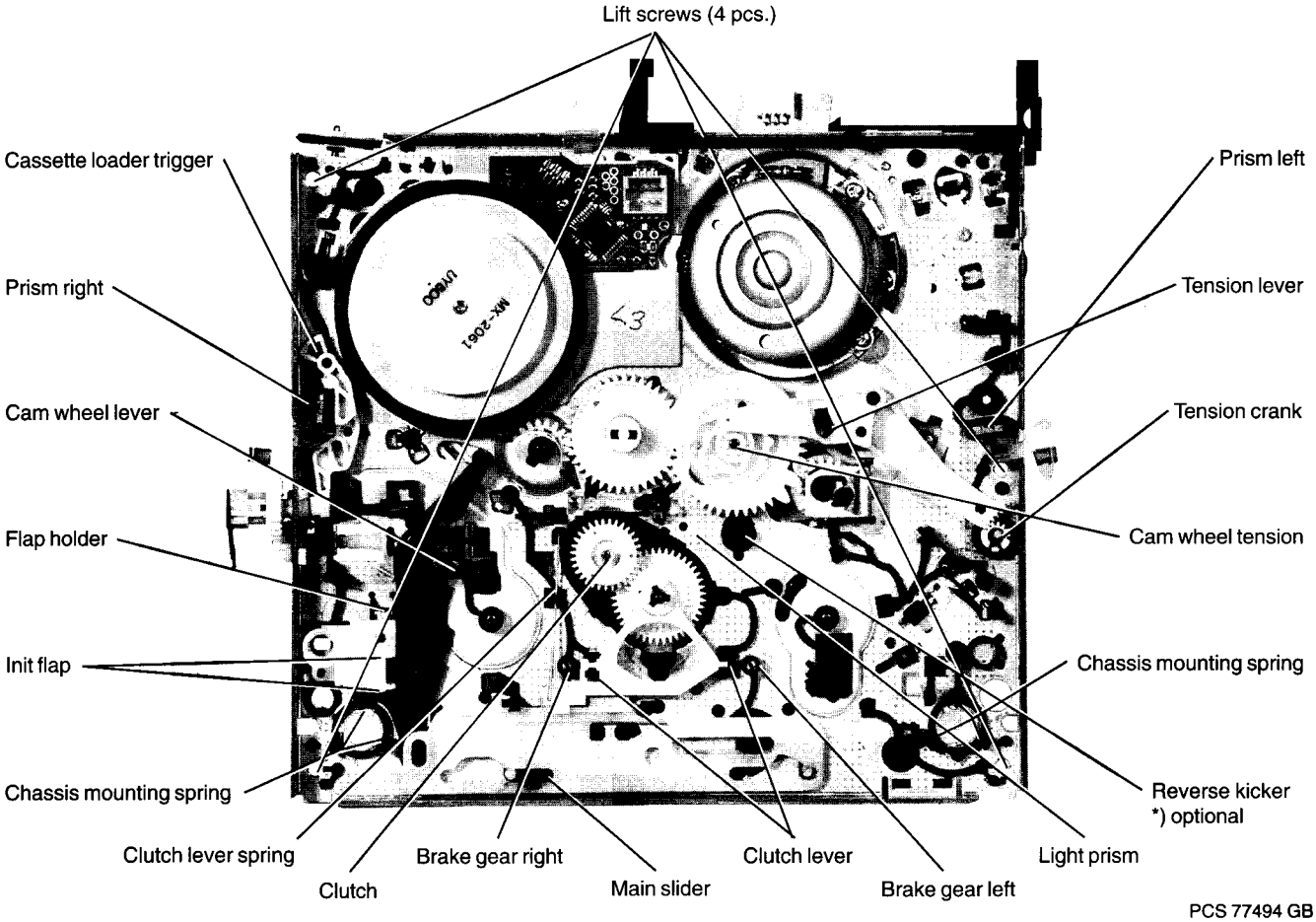
pos.150

In order to make the replacement of the deck parts easier, the snap hooks are marked with an arrow.

TOP VIEW

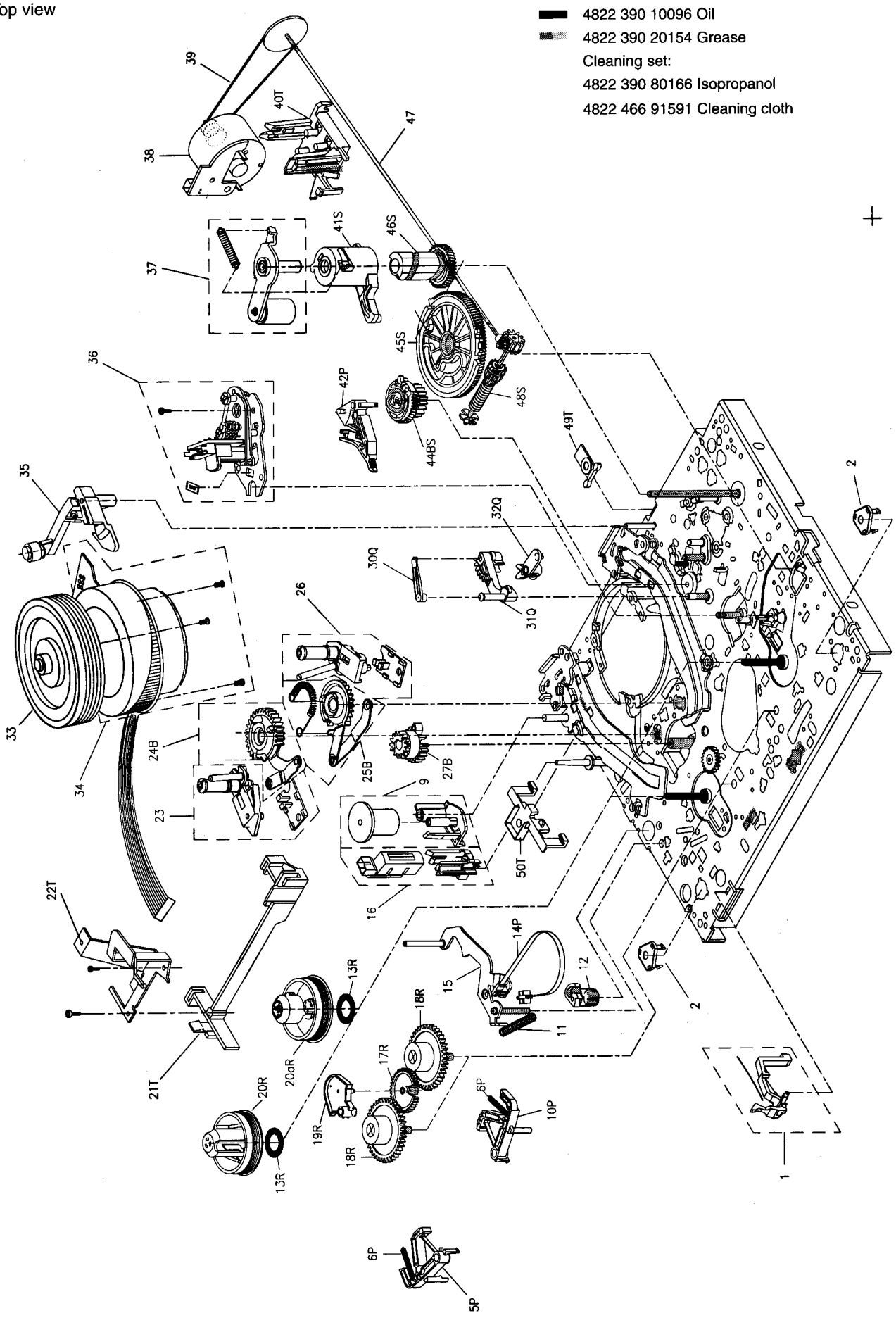


UNDERSIDE VIEW

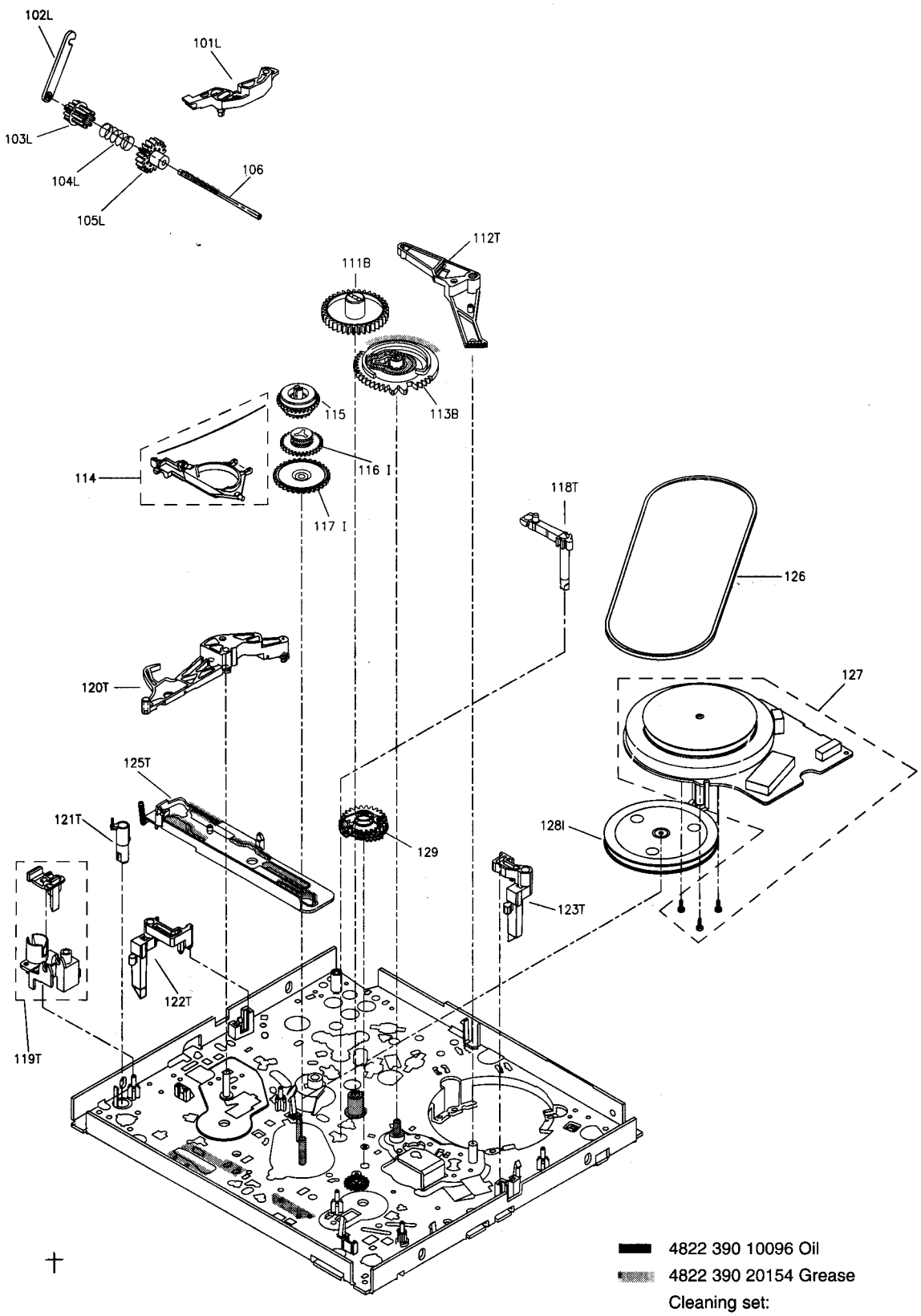


4.3 Exploded view

Top view



Underside view



4822 390 10096 Oil
4822 390 20154 Grease
Cleaning set:
4822 390 80166 Isopropanol
4822 466 91591 Cleaning cloth

MECHANICAL PARTS LIST

Pos.	Description	KITS								Code number 4822
		B	I	L	P	Q	R	S	T	
1	Rec. protection lever (with spring)									402 10202
2	Chassis mounting spring (2x)									492 71022
5	Main brake left				P					
6	Main brake spring (2x)				P					
9	Damping roller *)									528 70782
10	Main brake right				P					
11	Tension arm spring									492 33317
12	Tension crank									403 70551
13	Slip ring						R			
14	Tension band				P					
15	Tension arm									403 70547
16	Erase head									249 10522
17	Swivelling gear						R			
18	Brake gear (2x)						R			
19	Swivelling plate						R			
20	Reel table (S)						R			
20a	Reel table (T)						R			
21	Headamplifier holder								T	
22	Bracket								T	
23	Roller unit left									528 70771
24	Loading arm left	B								
25	Loading arm right	B								
26	Roller unit right									528 70772
27	Loading gear	B								
30	Reverse clip					Q				
31	Reverse lever					Q				
32	Intermediate lever					Q				
33	Head disc 2/0									691 10583
33	Head disc 2/0-LP									691 10585
33	Head disc 4/0									691 21011
33	Head disc 4/0 Secam									691 21012
33	Head disc 4/2									691 10548
33	Head disc 4/2 Secam									691 10551
34	Scanner motor 2/0 (with screws)									361 10963
34	Scanner motor 4/0 (with screws)									361 10819
34	Scanner motor 4/2 (with screws)									361 10901
35	Cleaning roller									528 70773
36	A/C Head (with clip and screws)									249 10468
37	Pressure roller (with spring)									528 70774
38	Threading motor									361 10809
39	Threading belt									358 20421
40	Motor holder								T	
41	Pressure roller guide							S		
42	Reverse brake				P					
44	Slider gear	B						S		
45	Cam wheel							S		
46	Cam shaft							S		
47	Pulley shaft									528 81462
48	Worm shaft							S		
49	Chassis mounting clip								T	
50	WD-holder								T	

Pos.	Description	KITS								Code number 4822
		B	I	L	P	Q	R	S	T	
101	Cassette loader trigger			L						
102	Clip			L						
103	Cassette loader gear1			L						
104	Cassette loader spring			L						
105	Cassette loader gear2			L						
106	Spindle									535 93277
111	Cam wheel reverse	B								
112	Tension lever								T	
113	Cam wheel tension	B								
114	Clutch lever (with spring)									403 70549
115	Clutch									528 20736
116	Changing gear		I							
117	Double gear		I							
118	Light prism								T	
119	Init flap and holder								T	
120	Cam wheel lever								T	
121	S-VHS lever								T	
122	Prism rihgt								T	
123	Prism left								T	
125	Main slider								T	
126	Driving belt									358 31166
127	Capstan motor (with screws)									361 10805
129	Reverse kicker with transmission gears *)									522 20451
128	Gear pulley		I							
150	Lift									443 64112
KIT	B									310 31955
KIT	I									310 31963
KIT	L									310 32116
KIT	P									310 32191
KIT	Q									310 10658
KIT	R									310 10659
KIT	S									310 10661
KIT	T									310 10662

*) optional

Um eine hohen Reparaturstandard zu gewährleisten sind mit Ausnahme von Kit T immer alle im Kit enthaltenen Teile zu tauschen.

In order to guarantee a high repairstandard all spare parts included in a kit have to be replaced with the exception of kit T.

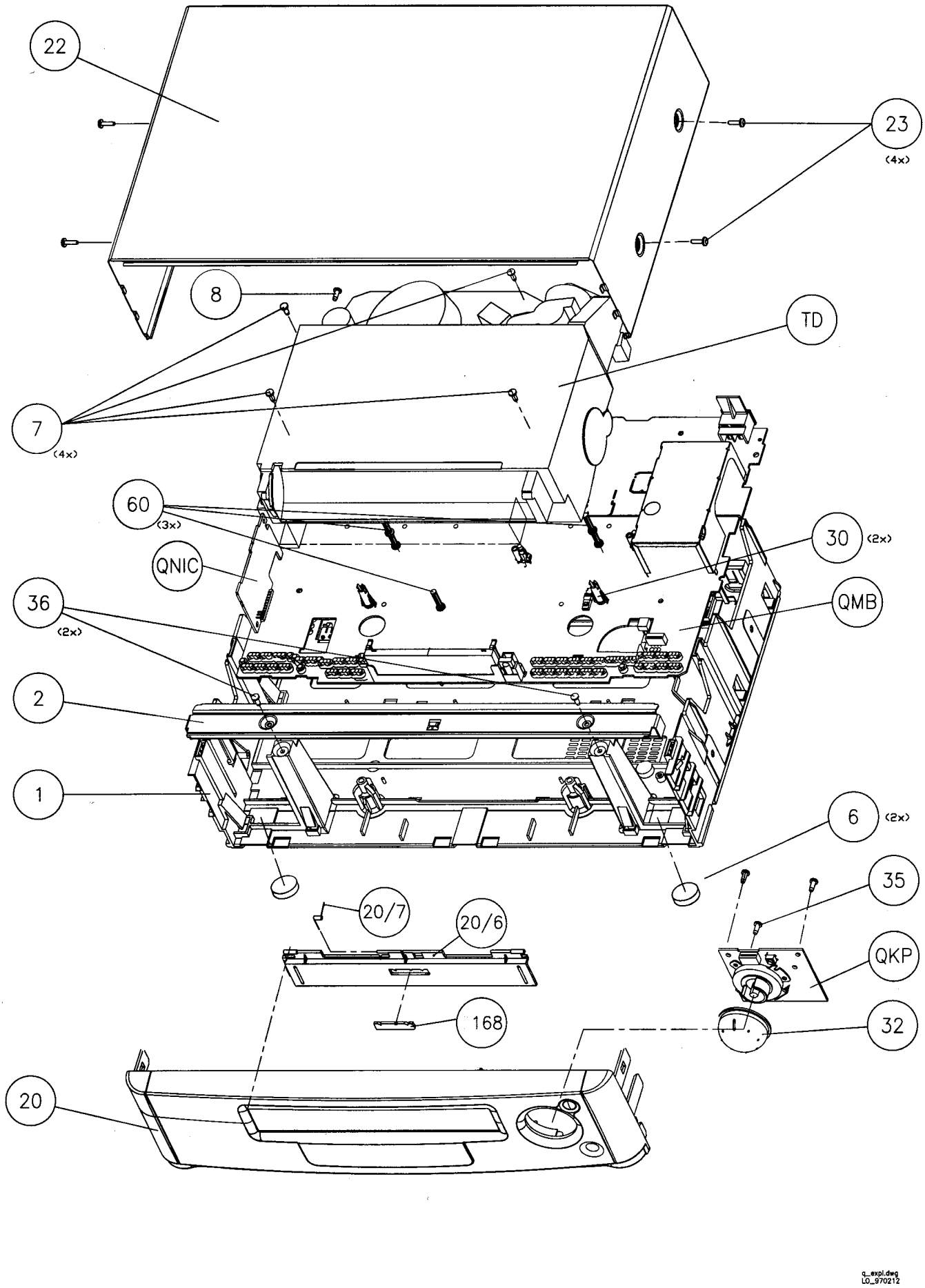
Per una riparazione garantita ocorre sostituire tutti i pezzi contenuti nei kit, fatta eccetione per il kit T.

Para obtener un estandár de reparaciones elevado,es necesario cambiar todas las partes contenidas en el kit, la única exceptión es para el kit T.

A fin d'obtenir un standard de réparations élevé, toutes les pièces de rechange incluses dans un kit sont à remplacer, exception faite du kit T.

Om een hoge reparatiekwaliteit te waarbogen moeten, met uitzondering van kit T, altijd alle zich in een kit bevindende onderdelen worden vervangen.

PARTS LISTS
Exploded View set



Partslists

POS	Service Code	Description	VR171/02	VR171/13	VR171/16	VR171/58	VR175/02	VR175/05	VR175/13	VR175/16	VR175/39	VR276/02	VR276/39	VR277/02	VR277/05	VR475/02	VR475/16	VR475/39	VR475/58	VR476/39	VR477/02	VR477/39	VR477/58
1	4822 464 10287	FRAME ASSY 1SCART	1	1		1			1										1				
	4822 464 10286	FRAME ASSY 2SCART			1		1	1		1	1	1	1	1	1	1	1	1		1	1	1	1
	4822 464 10285	FRAME ASSY CINCH																					
2	4822 402 10709	BRACKET	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
6	4822 462 41806	FOOT	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
7	4822 502 13884	SCREW 3,5X16	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
8	4822 502 14431	SCREENING SCREW	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
20	4822 426 10422	CONTROL PANEL	1			1																	
	4822 426 10437	CONTROL PANEL		1																			
	4822 426 10409	CONTROL PANEL			1																		
	4822 426 10408	CONTROL PANEL				1			1														
	4822 426 10407	CONTROL PANEL						1															
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	4822 426 10405	CONTROL PANEL									1												
	4822 426 10404	CONTROL PANEL										1											
	4822 426 10403	CONTROL PANEL											1										
	4822 426 10402	CONTROL PANEL												1									
	4822 426 10401	CONTROL PANEL													1								
	4822 426 10399	CONTROL PANEL													1				1				
	4822 426 10432	CONTROL PANEL															1						
	4822 426 10398	CONTROL PANEL															1		1				
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	4822 426 10393	CONTROL PANEL																					
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	4822 426 10417	CONTROL PANEL																					
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	4822 426 10413	CONTROL PANEL																					
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	4822 426 10421	CONTROL PANEL																					
	4822 426 10426	CONTROL PANEL																					
	4822 426 10387	CONTROL PANEL																					
	4822 426 10386	CONTROL PANEL																					
	4822 426 10385	CONTROL PANEL																					
	4822 426 10428	CONTROL PANEL																					
	4822 426 10419	CONTROL PANEL																					
20/6	4822 443 10627	LIFT FLAP	1																				
	4822 443 10659	LIFT FLAP		1																			
	4822 443 10615	LIFT FLAP			1																		
	4822 443 10614	LIFT FLAP					1		1														
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	4822 443 10605	LIFT FLAP														1			1				
	4822 443 10645	LIFT FLAP														1			1				
	4822 443 10604	LIFT FLAP																1					
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	4822 443 10602	LIFT FLAP																			1		1
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	4822 443 10622	LIFT FLAP																					
	4822 443 10621	LIFT FLAP																					

VR675/02	VR675/05	VR675/16	VR675/39	VR676/02	VR676/05	VR676/39	SB100/03	SB100/11	SB100/38	SB105/03	SB105/11	SB105/38	SB205/02	SB405/11	SB405/38	SB505/38	SB605/03	SB605/11	SB605/38	SB705/38	DV105/05	DV605/05	20DV7/39	25DV7/39	45DV7/39	65DV7/39	MV1971
							1	1		1	1			1							1							
									1			1	1		1	1							1	1	1		1
1	1	1	1	1	1	1											1	1	1	1		1				1	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Partslists

POS	Service Code	Description	VR171/02	VR171/13	VR171/16	VR171/58	VR175/02	VR175/05	VR175/13	VR175/16	VR175/39	VR276/02	VR276/39	VR277/02	VR277/05	VR475/02	VR475/16	VR475/39	VR475/58	VR476/39	VR477/02	VR477/39
20/6	4822 443 10619	LIFT FLAP																				
	4822 443 10618	LIFT FLAP																				
	4822 443 10661	LIFT FLAP																				
	4822 443 10617	LIFT FLAP																				
	4822 443 10616	LIFT FLAP																				
	4822 443 10642	LIFT FLAP																				
	4822 443 10648	LIFT FLAP																				
	4822 443 10647	LIFT FLAP																				
	4822 443 10646	LIFT FLAP																				
	4822 443 10644	LIFT FLAP																				
	4822 443 10626	LIFT FLAP																				
	4822 443 10641	LIFT FLAP																				
	4822 443 10593	LIFT FLAP																				
	4822 443 10592	LIFT FLAP																				
	4822 443 10591	LIFT FLAP																				
	4822 443 10643	LIFT FLAP																				
	4822 443 10625	LIFT FLAP																				
20/7	4822 492 70896	LEG SPRING	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	4822 442 00886	COVER LACQUERED 0MM															1					
	4822 442 00884	COVER LACQUERED											1	1	1					1	1	1
	4822 442 00887	COVER LACQUERED	1	1	1	1	1	1	1	1	1	1				1		1	1			
23	4822 502 14109	SCREW 3,5X10	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
30	4822 256 10198	DISTANCEHOLDER DECK	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
32	4822 410 11107	SHUTTLE KNOB												1	1						1	1
35	4822 502 11839	SCREW 2,9X8												3	3						3	3
36	4822 502 11833	SCREW P2,9X12	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
60	4822 256 10359	DISTANCE HOLDER MOBO	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
152	4822 736 15245	DFU VR171/02	1																			
	4822 736 15287	DFU VR171/13		1																		
	4822 736 15239	DFU VR171/16																				
	4822 736 15231	DFU VR171/58				1																
	4822 736 15228	DFU VR175/02					1															
	4822 736 15226	DFU VR175/05						1														
	4822 736 15267	DFU VR175/13																				
	4822 736 15225	DFU VR175/16								1												
	4822 736 15224	DFU VR175/39									1											
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	4822 736 15222	DFU VR276/39											1									
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	4822 736 15219	DFU VR277/05													1							
	4822 736 15218	DFU VR475/02														1						
	4822 736 15271	DFU VR475/16															1					
	4822 736 15217	DFU VR475/39																1				
	4822 736 15216	DFU VR475/58																	1			
	4822 736 15215	DFU VR476/39																		1		
	4822 736 15214	DFU VR477/02																			1	
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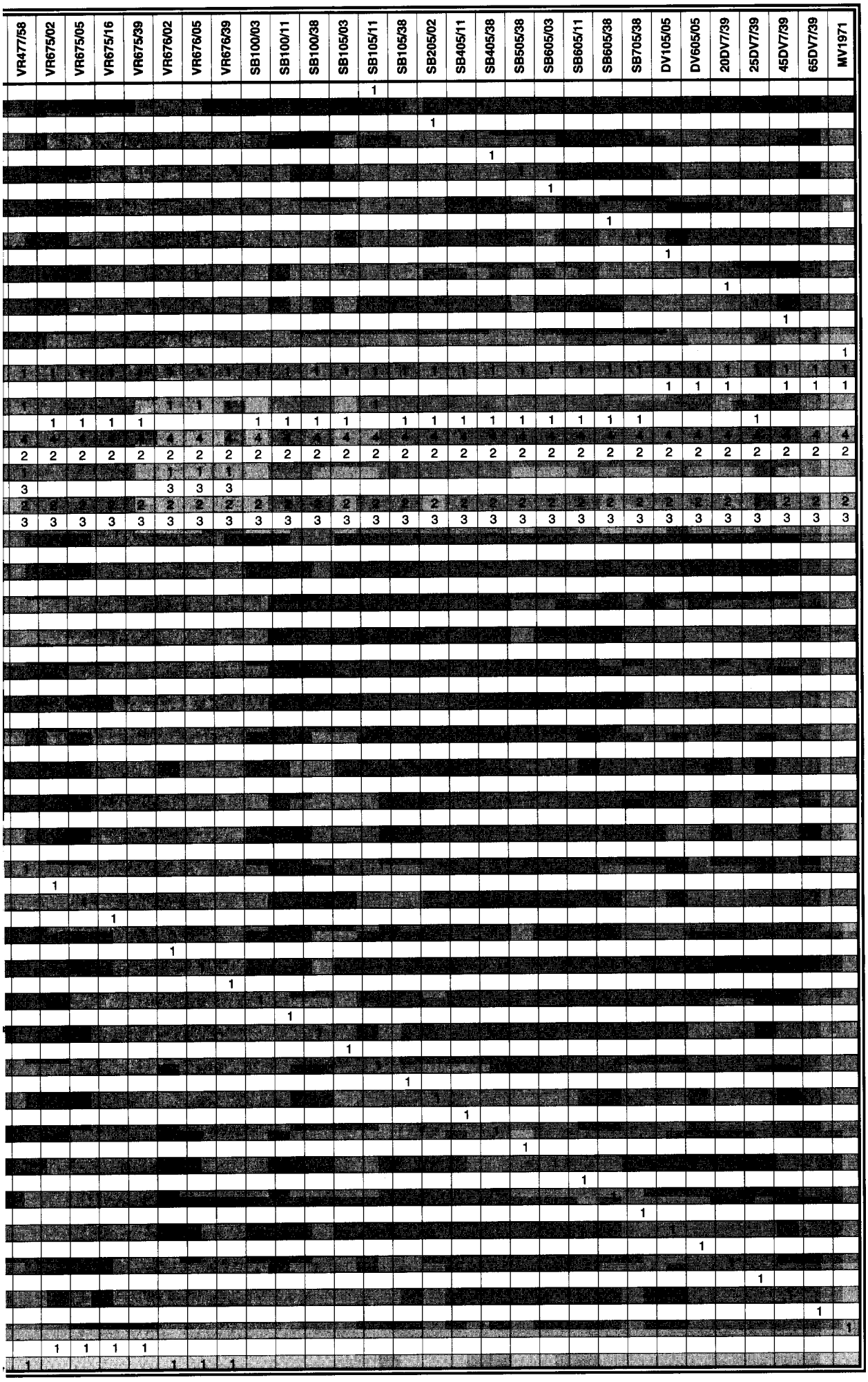
	4822 736 15266	DFU VR477/58																				
	4822 736 15212	DFU VR675/02																				
	4822 736 15211	DFU VR675/05																				
	4822 736 15269	DFU VR675/16																				
	4822 736 15209	DFU VR675/39																				
	4822 736 15208	DFU VR676/02																				
	4822 736 15207	DFU VR676/05																				
	4822 736 15206	DFU VR676/39																				
	4822 736 15242	DFU SB100/03																				
	4822 736 15241	DFU SB100/11																				
	4822 736 15239	DFU SB100/38																				
	4822 736 15238	DFU SB105/03																				
	4822 736 15237	DFU SB105/11																				
	4822 736 15236	DFU SB105/38																				
	4822 736 15291	DFU SB205/02																				
	4822 736 15235	DFU SB405/11																				
	4822 736 15234	DFU SB405/38																				
	4822 736 15264	DFU SB505/38																				
	4822 736 15274	DFU SB605/03																				
	4822 736 15273	DFU SB605/11																				
	4822 736 15272	DFU SB605/38																				
	4822 736 15268	DFU SB705/38																				
	4822 736 15244	DFU DV105/05																				
	4822 736 15263	DFU DV605/05																				
	4822 736 15205	DFU 20DV7/39																				
	4822 736 15204	DFU 25DV7/39																				
	4822 736 15203	DFU 45DV7/39																				
	4822 736 15265	DFU 65DV7/39																				
	4822 736 15243	DFU MV1971																				
168	4822 459 11235	WORDMARK PHILIPS	1	1	1	1	1	1	1	1	1					1	1	1	1			
168	4822 459 10886	WORDMARK PHILIPS										1	1	1	1					1	1	1


VR477/58
VR675/02
VR675/05
VR675/16
VR675/39
VR676/02
VR676/05
VR676/39
SB100/03
SB100/11
SB100/38
SB105/03
SB105/11
SB105/38
SB205/02
SB405/11
SB405/38
SB505/38
SB605/03
SB605/11
SB605/38
SB705/38
DV105/05
DV605/05
20DV7/39
25DV7/39
45DV7/39
65DV7/39
MV1971

Motherboard QMB PAL, SECAM, MONO, STEREO

CONNECTORS

1001⚠	4822 267 10577	MAINS PLUG
1002	4822 267 10498	CONN. 3p
1710	4822 265 30989	CONN. 3p
1750	4822 267 10458	CONN. 3p
1908	4822 267 10584	CONN. 1p
1909	4822 267 10583	CONN. 1p
1911	4822 265 10938	CINCH 2p white
1912	4822 265 10939	CINCH 2p red
1915	4822 267 10364	CONN. 9p
1916	4822 267 41199	CONN. 5p
1917	4822 264 10345	SCART CONN. ORANGE
1918	4822 264 10346	SCART CONN. BLUE
1930	4822 267 41062	CONN. 6p
1944	4822 265 30989	CONN. 3p
1945	4822 267 51261	CONN. 8p
1946	4822 267 10366	CONN. 8p
1961	4822 267 31512	CONN. 7p
1962	5322 268 90415	CONN. 2p

MISCELLANEOUS

0005	4822 256 10355	DISPLAY HOLDER
0007	4822 256 10195	HOLDER
0008	4822 256 10196	HOLDER
0020	4822 256 10197	HOLDER
0021	4822 256 10197	HOLDER
0022	4822 256 10197	HOLDER
1000	4822 242 81067	Crystal 4.433 619 MHz
1101	4822 276 13732	SWITCH TACT PUSH
1102	4822 276 13732	SWITCH TACT PUSH
1103	4822 276 13732	SWITCH TACT PUSH
1105	4822 276 13732	SWITCH TACT PUSH
1108	4822 276 13732	SWITCH TACT PUSH
1109	4822 276 13732	SWITCH TACT PUSH
1110	4822 276 13732	SWITCH TACT PUSH
1113	4822 276 13732	SWITCH TACT PUSH
1124	4822 276 13732	SWITCH TACT PUSH
1132	4822 276 13732	SWITCH TACT PUSH
1134	4822 276 13732	SWITCH TACT PUSH
1135	4822 276 13732	SWITCH TACT PUSH
1136	4822 276 13732	SWITCH TACT PUSH
1140	4822 276 13732	SWITCH TACT PUSH
1141	4822 276 13732	SWITCH TACT PUSH
1142	4822 276 13732	SWITCH TACT PUSH
1143	4822 276 13732	SWITCH TACT PUSH
1144	4822 276 13732	SWITCH TACT PUSH
1145	4822 276 13732	SWITCH TACT PUSH
1146	4822 276 13732	SWITCH TACT PUSH
1147	4822 276 13732	SWITCH TACT PUSH
1148	4822 276 13732	SWITCH TACT PUSH
1154	4822 276 13732	SWITCH TACT PUSH
1155	4822 276 13732	SWITCH TACT PUSH
1163	4822 276 13732	SWITCH TACT PUSH
1178	4822 276 13732	SWITCH TACT PUSH
1181	4822 276 13732	SWITCH TACT PUSH
1182	4822 276 13732	SWITCH TACT PUSH
1183	4822 276 13732	SWITCH TACT PUSH
1185	4822 276 13732	SWITCH TACT PUSH
1186	4822 276 13732	SWITCH TACT PUSH
1190	4822 276 13732	SWITCH TACT PUSH
1192	4822 276 13732	SWITCH TACT PUSH
1193	4822 276 13732	SWITCH TACT PUSH
1203	4822 276 13732	SWITCH TACT PUSH
1208	4822 276 13732	SWITCH TACT PUSH
1214	4822 276 13732	SWITCH TACT PUSH
1219	4822 276 13732	SWITCH TACT PUSH
1222	4822 276 13732	SWITCH TACT PUSH
1223	4822 276 13732	SWITCH TACT PUSH
1224	4822 276 13732	SWITCH TACT PUSH
1227	4822 276 13732	SWITCH TACT PUSH
1228	4822 276 13732	SWITCH TACT PUSH
1229	4822 276 13732	SWITCH TACT PUSH
1230	4822 276 13732	SWITCH TACT PUSH
1231	4822 276 13732	SWITCH TACT PUSH
1232	4822 276 13732	SWITCH TACT PUSH
1233	4822 276 13732	SWITCH TACT PUSH
1234	4822 276 13732	SWITCH TACT PUSH
1235	4822 276 13732	SWITCH TACT PUSH
1236	4822 276 13732	SWITCH TACT PUSH
1242	4822 276 13732	SWITCH TACT PUSH
1297	5322 242 73682	Crystal 32,768 KHZ
1298	4822 242 82114	Crystal 8,00 MHZ
1350⚠	4822 252 11234	Fuse 100 mA
1351⚠	4822 071 55001	Fuse 500 mA
1352⚠	4822 071 55001	Fuse 500 mA
1353⚠	4822 070 31252	Fuse 1.25 A
1355⚠	4822 252 11235	Fuse 1.0 A
1356⚠	4822 252 11235	Fuse 1.0 A
1400	4822 242 82059	Crystal 10 MHZ
1460	4822 277 11521	Switch
1461	4822 277 11521	Switch
1701	4822 210 10701	TMRB1-101A, TP944 PAL-I/UK
1701	4822 210 10709	TMRG1-104A PAL I /07
1701	4822 210 10702	TMRG1-101A,TP916(L)PAL-G (Passive Loop Through)
1701	4822 210 10698	TMRG2-102A, TP926 SECAM (Booster SECAM)
1701	4822 210 10723	TMRG1-201A PAL G/K
1719	4822 242 10688	OFWK9456M SEC-LL'
1719	4822 242 10306	OFWK9463M SEC-DK
1720	4822 242 81964	G1984 FM stereo PAL-G
1720	4822 242 81737	G1965 mono SEC
1720	4822 242 10307	OFWG3956M SEC-DK
1720	4822 242 81436	OFWK3953M stereo SEC
1721	4822 242 81388	OFWG1961M mono PAL-G
1721	4822 242 81261	OFWG1966M mono SEC-DK
1721	4822 242 10575	OFWJ1980M PAL-I
1722	4822 242 10318	OFWL9360M mono SEC-DK
1740	4822 242 72586	TPS 5,5MB-TF20 PAL-G
1740	4822 242 81572	TPS 6,0MB-TF21 PAL-I
1745	4822 242 70279	SFE 6,0MB SEC-L, PAL-I
1745	4822 242 10428	EFCT5R5YS5A PAL-G
1745	4822 242 10429	EFCT6R5YS5A SEC-DK
1746	4822 242 10428	EFCT5R5YS5A
1747	4822 242 10563	EFCT5R74YS5A stereo FM
1748	4822 242 10754	EFCT6R25YS5A stereo DK
1781	4822 242 82059	Crystal 10 MHZ

CAPACITORS

2001	4822 126 10002	100nF20%Y5V	25V
2002	4822 122 33177	10nF 20% X7R	50V
2003	4822 126 10002	100nF20%Y5V	25V
2004	4822 122 33177	10nF 20% X7R	50V
2005	4822 124 23055	22µF20%	16V
2006	4822 126 13222	390pF 2% np0	63V
2007	5322 122 32966	39pF 5%np0	50V
2008	5322 122 32658	22pF 5%	50V
2009	4822 126 10002	100nF20%Y5V	25V
2010	4822 124 80987	220µF20%	6,3V
2011	4822 122 33177	10nF 20% X7R	50V
2012	4822 124 11569	4,7µF 20%	25V
2013	4822 126 10002	100nF20%Y5V	25V
2014	4822 124 80975	0,47µF20%	50V
2015	4822 126 10002	100nF20%Y5V	25V
2016	4822 126 10002	100nF20%Y5V	25V
2017	4822 124 22826	10µF	16V
2018	5322 122 32658	22pF 5%	50V
2019	4822 124 22826	10µF	16V
2020	4822 124 22826	10µF	16V
2021	4822 124 22826	10µF	16V
2022	4822 126 10002	100nF20%Y5V	25V
2023	4822 122 33177	10nF 20% X7R	50V
2024	4822 126 10002	100nF20%Y5V	25V
2025	4822 124 11568	47µF 20%	16V

⚠ Safety component, use only this type

Motherboard QMB PAL, SECAM, MONO, STEREO

2026	4822 122 33575	220pF 5%	50V
2027	4822 122 33177	10nF 20% X7R	50V
2028	4822 122 33177	10nF 20% X7R	50V
2029	4822 122 33177	10nF 20% X7R	50V
2030	4822 122 33177	10nF 20% X7R	50V
2031	4822 126 10002	100nF20%Y5V	25V
2032	4822 124 11568	47µF 20%	16V
2033	4822 126 10002	100nF20%Y5V	25V
2034	4822 122 33177	10nF 20% X7R	50V
2035	4822 122 33177	10nF 20% X7R	50V
2036	4822 122 33515	82pF 5%	63V
2037	4822 126 14124	220pF 2%	
2038	5322 122 32659	33pF 5%	50V
2038	5322 122 32658	22pF 5%	50V for 2 heads
2039	4822 124 23053	1µF20%	63V
2040	5322 122 32654	22nF10%X7R	63V
2041	4822 124 23053	1µF20%	63V
2042	4822 122 33797	47nF20%Y5V	50V
2043	4822 124 41969	1µF20%	50V
2044	4822 124 23053	1µF20%	63V
2045	4822 122 33797	47nF20%Y5V	50V
2046	5322 122 34123	1nF10%X7R	50V
2047	4822 122 33177	10nF 20% X7R	50V
2049	4822 124 11568	47µF 20%	16V
2054	4822 124 41969	1µF20%	50V
2055	4822 122 33177	10nF 20% X7R	50V
2059	4822 124 23053	1µF20%	63V
2064	5322 122 31946	27pF 5%	63V
2066	4822 122 33177	10nF 20% X7R	50V
2080	5322 122 32658	22pF 5%	50V
2081	4822 122 33177	10nF 20% X7R	50V
2082	4822 122 33177	10nF 20% X7R	50V
2083	4822 122 33177	10nF 20% X7R	50V
2084	4822 122 33177	10nF 20% X7R	50V
2085	4822 126 10002	100nF20%Y5V	25V
2086	4822 124 11568	47µF 20%	16V
2087	4822 122 33177	10nF 20% X7R	50V
2089	4822 122 33575	220pF 5%	50V
2100	4822 122 33177	10nF 20% X7R	50V
2101	5322 122 32531	100pF 5%	50V
2102	5322 122 32658	22pF 5%	50V
2103	5322 122 34123	1nF10%X7R	50V
2104	4822 122 33177	10nF 20% X7R	50V
2105	4822 122 33177	10nF 20% X7R	50V
2106	4822 122 33177	10nF 20% X7R	50V
2107	4822 122 33177	10nF 20% X7R	50V
2108	5322 122 33538	150pF 2%	63V
2109	5322 122 32481	15pF 5%	50V
2110	4822 126 10002	100nF20%Y5V	25V
2111	4822 126 13694	68pF 1%	63V
2112	4822 122 33177	10nF 20% X7R	50V
2113	4822 126 10002	100nF20%Y5V	25V
2115	4822 122 33575	220pF 5%	50V
2116	4822 122 33177	10nF 20% X7R	50V
2117	5322 122 34123	1nF10%X7R	50V
2118	5322 122 32659	33pF 5%	50V
2119	5322 122 32531	100pF 5%	50V
2121	5322 122 34123	1nF10%X7R	50V
2122	4822 122 33177	10nF 20% X7R	50V
2123	4822 126 10002	100nF20%Y5V	25V
2124	4822 126 10002	100nF20%Y5V	25V
2125	4822 122 33515	82pF 5%	63V
2126	5322 122 31946	27pF 5%	63V
2128	4822 122 33515	82pF 5%	63V
2129	4822 122 33515	82pF 5%	63V
2130	4822 122 33575	220pF 5%	50V
2132	5322 122 32269	6,8pF 5%	50V
2133	5322 122 32452	47pF 5%	63V
2134	4822 122 33575	220pF 5%	50V
2135	5322 122 31946	27pF 5%	63V
2137	4822 116 10056	VDR 0805 1MA/ 8VMAX	
2138	4822 116 10056	VDR 0805 1MA/ 8VMAX	
2150	4822 122 33177	10nF 20% X7R	50V
2151	4822 126 13061	220nF20% Y5V	25V
2152	4822 124 11568	47µF 20%	16V
2153	5322 122 32654	22nF 10% X7R	63V
2154	4822 122 33177	10nF 20% X7R	50V
2155	4822 122 33177	10nF 20% X7R	50V
2156	4822 122 33177	10nF 20% X7R	50V
2157	4822 122 33177	10nF 20% X7R	50V
2158	4822 122 33177	10nF 20% X7R	50V
2159	4822 122 33177	10nF 20% X7R	50V
2160	4822 122 33177	10nF 20% X7R	50V
2161	4822 122 33177	10nF 20% X7R	50V
2163	5322 122 32531	100pF 5%	50V
2203	5322 122 32481	15pF 5%	50V
2204	5322 122 32481	15pF 5%	50V
2210	4822 122 33177	10nF 20% X7R	50V
2211	4822 124 81112	220µF20%	10V
2212	4822 126 13061	220nF20% Y5V	25V
2220	4822 124 23055	22µF20%	16V
2230	4822 122 33177	10nF 20% X7R	50V
2231	4822 122 33797	47nF20%Y5V	50V
2232	4822 122 33177	10nF 20% X7R	50V
2233	4822 122 33177	10nF 20% X7R	50V
2251	4822 126 10002	100nF20%Y5V	25V
2252	4822 126 10002	100nF20%Y5V	25V
2297	4822 124 11968	220mF +80-20%	5,5V
2300	4822 124 80407	1µF20%	50V
2301	4822 124 80407	1µF20%	50V
2302	4822 124 80407	1µF20%	50V
2308	5322 122 32531	100pF 5%	50V
2310	4822 126 10002	100nF20%Y5V	25V
2311	4822 122 33177	10nF 20% X7R	50V
2313	4822 122 33575	220pF 5%	50V
2314	4822 126 10002	100nF20%Y5V	25V
2315	4822 122 33177	10nF 20% X7R	50V
2316	4822 122 33797	47nF20%Y5V	50V
2317	5322 122 32654	22nF10%X7R	63V
2318	4822 124 22263	220µF20%	25V
2319	5322 122 32654	22nF10%X7R	63V
2320	5322 122 32654	22nF10%X7R	63V
2350	4822 126 14125	470pF 2%	
2353	4822 126 13196	100nF10% X7R	25V
2354	4822 126 10002	100nF20%Y5V	25V
2355	5322 122 34123	1nF10%X7R	50V
2356	4822 124 23053	1µF20%	63V
2357 ⚠	4822 126 13841	1nF 20%	250V
2358	4822 126 10002	100nF20%Y5V	25V
2359	4822 126 13061	220nF20% Y5V	25V
2360 ⚠	4822 121 10667	68nF 20%	275V
2361	4822 124 22864	47µF	50V
2362 ⚠	4822 124 11969	22µF 20%	400V
2363	4822 124 22864	47µF	50V
2364	4822 124 11899	220µF 20%	25V
2365	4822 124 11971	470µF 20%	16V
2366	4822 126 14126	47pF 5%	2KV
2367	4822 124 11899	220µF 20%	25V
2368	4822 122 31175	1nF 10%	500V
2369	4822 126 10002	100nF20%Y5V	25V
2370	4822 124 23052	100µF20%	16V
2371	4822 124 11971	470µF 20%	16V
2372	4822 126 13061	220nF20% Y5V	25V
2373	4822 124 11486	220µF 20%	16V
2374	4822 124 11971	470µF 20%	16V
2375	4822 121 42004	10nF 10%	400V
2376	4822 124 22833	10µF	50V
2378	4822 121 42004	10nF 10%	400V
2379	5322 126 10223	4,7nF10%X7R	63V
2385	4822 124 11486	220µF 20%	16V
2386	5322 122 32268	470pF 10%	50V
2400	4822 122 33177	10nF 20% X7R	50V
2401	4822 124 23055	22µF20%	16V
2403	5322 122 32658	22pF 5%	50V
2404	5322 122 32658	22pF 5%	50V
2416	4822 126 10002	100nF20%Y5V	25V
2417	4822 124 81295	47µF20%	6,3V
2440	4822 124 81029	100µF20%	25V
2441	4822 126 10002	100nF20%Y5V	25V
2442	4822 122 33177	10nF 20% X7R	50V

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Motherboard QMB PAL, SECAM, MONO, STEREO

2455	4822 122 33175	2,2nF 20% X7R	50V	
2459	4822 124 22263	220µF20%	25V	
2461	5322 126 10223	4,7nF10%X7R	63V	
2463	4822 124 23027	47µF	6.3V	
2464	5322 126 10223	4,7nF10%X7R	63V	
2465	4822 122 33175	2,2nF 20% X7R	50V	
2466	4822 124 23027	47µF	6.3V	
2467	4822 122 33342	33nF10%X7R	63V	
2468	4822 126 10002	100nF20%Y5V	25V	
2470	4822 122 33177	10nF 20% X7R	50V	
2471	4822 122 33177	10nF 20% X7R	50V	
2472	5322 122 32531	100pF 5%	50V	
2473	5322 122 32531	100pF 5%	50V	
2474	5322 122 32531	100pF 5%	50V	
2501	4822 126 10002	100nF20%Y5V	25V	
2502	4822 124 22826	10µF	16V	
2503	4822 124 22826	10µF	16V	
2504	4822 116 10056	VDR 0805 1MA/ 8VMAX		for stereo
2504	5322 122 32268	470pF 10%	50V	for mono
2505	5322 122 32268	470pF 10%	50V	for mono
2505	4822 116 10056	VDR 0805 1MA/ 8VMAX		for stereo
2506	4822 116 10056	VDR 0805 1MA/ 8VMAX		for stereo
2506	5322 122 32268	470pF 10%	50V	for mono
2507	4822 116 10056	VDR 0805 1MA/ 8VMAX		
2508	4822 126 10002	100nF20%Y5V	25V	
2509	5322 122 32268	470pF 10%	50V	for mono
2509	4822 116 10056	VDR 0805 1MA/ 8VMAX		for stereo
2510	5322 122 32268	470pF 10%	50V	for mono
2510	4822 116 10056	VDR 0805 1MA/ 8VMAX		for stereo
2511	4822 116 10056	VDR 0805 1MA/ 8VMAX		for stereo
2511	5322 122 32268	470pF 10%	50V	for mono
2512	4822 116 10056	VDR 0805 1MA/ 8VMAX		
2514	4822 124 23027	47µF	6.3V	
2515	4822 126 10002	100nF20%Y5V	25V	
2516	4822 124 11568	47µF 20%	16V	
2517	4822 126 10002	100nF20%Y5V	25V	
2519	4822 126 10002	100nF20%Y5V	25V	
2520	4822 126 10002	100nF20%Y5V	25V	
2521	4822 126 10002	100nF20%Y5V	25V	
2523	4822 126 10002	100nF20%Y5V	25V	
2524	4822 126 10002	100nF20%Y5V	25V	
2525	4822 126 10002	100nF20%Y5V	25V	
2526	4822 126 10002	100nF20%Y5V	25V	
2527	4822 126 10002	100nF20%Y5V	25V	
2530	4822 126 13061	220nF20% Y5V	25V	
2540	4822 126 10002	100nF20%Y5V	25V	
2541	4822 122 33175	2,2nF 20% X7R	50V	
2542	4822 122 33342	33nF10%X7R	63V	
2543	4822 126 13482	470nF80/20%	16V	
2545	4822 126 10002	100nF20%Y5V	25V	
2600	5322 126 10184	680p 5%	50V	
2601	4822 122 33175	2,2nF 20% X7R	50V	
2602	4822 124 22826	10µF	16V	
2603	4822 122 33177	10nF 20% X7R	50V	
2604	4822 124 22739	100µF	50V	for mono
2604	4822 124 22826	10µF	16V	for stereo
2605	5322 122 34123	1nF10%X7R	50V	
2606	4822 126 10002	100nF20%Y5V	25V	
2608	4822 122 33177	10nF 20% X7R	50V	
2617	4822 124 11568	47µF 20%	16V	
2618	5322 122 31863	330pF 5%	50V	
2619	4822 124 11568	47µF 20%	16V	
2620	4822 121 51655	47nF	50V	
2621	5322 122 34123	1nF10%X7R	50V	
2622	4822 121 43873	27nF 5%	50V	
2647	4822 126 10002	100nF20%Y5V	25V	
2648	4822 124 23055	22µF20%	16V	
2650	4822 126 10002	100nF20%Y5V	25V	
2651	4822 124 11568	47µF 20%	16V	
2652	4822 124 22826	10µF	16V	
2656	4822 126 14127	39nF 10%	50V	
2657	4822 122 33128	15nF10%X7R	63V	
2700	4822 126 10002	100nF20%Y5V	25V	
2701	4822 126 10002	100nF20%Y5V	25V	
2702	4822 126 10002	100nF20%Y5V	25V	
2704	4822 124 23052	100µF20%	16V	
2705	5322 122 32268	470pF 10%	50V	
2706	4822 122 33575	220pF 5%	50V	
2707	5322 122 33861	120pF10%	50V	
2708	4822 124 23055	22µF20%	16V	
2715	5322 122 32661	56pF 5%	50V	
2716	5322 122 32661	56pF 5%	50V	
2722	5322 122 34123	1nF10%X7R	50V	
2723	4822 122 33177	10nF 20% X7R	50V	
2726	4822 126 12104	12nF 5%X7R	63V	
2727	4822 124 23055	22µF20%	16V	
2728	4822 124 23055	22µF20%	16V	
2729	4822 122 33177	10nF 20% X7R	50V	
2730	5322 122 32452	47pF 5%	63V	
2731	5322 122 32452	47pF 5%	63V	
2732	5322 122 32452	47pF 5%	63V	
2733	4822 122 33177	10nF 20% X7R	50V	
2734	4822 126 10002	100nF20%Y5V	25V	
2735	5322 122 32452	47pF 5%	63V	
2740	4822 124 41576	2,2µF 20%	50V	
2741	4822 126 10002	100nF20%Y5V	25V	
2742	4822 124 23055	22µF20%	16V	
2743	4822 126 13061	220nF20% Y5V	25V	
2744	4822 124 40786	2,2µF20%	63V	
2745	4822 122 33575	220pF 5%	50V	
2746	4822 126 10002	100nF20%Y5V	25V	
2747	4822 126 10002	100nF20%Y5V	25V	
2748	4822 126 12945	8,2pF 2%		
2749	4822 126 13061	220nF20% Y5V	25V	
2750	4822 124 40786	2,2µF20%	63V	
2752	4822 126 13061	220nF20% Y5V	25V	
2780	4822 124 22826	10µF	16V	
2781	4822 122 33177	10nF 20% X7R	50V	
2782	4822 126 10002	100nF20%Y5V	25V	
2783	5322 126 10184	680p 5%	50V	
2784	4822 124 11568	47µF 20%	16V	
2785	5322 122 32531	100pF 5%	50V	
2786	4822 124 11569	4,7µF 20%	25V	
2787	4822 124 11569	4,7µF 20%	25V	
2788	5322 122 32654	22nF10% X7R	63V	
2789	4822 122 33177	10nF 20% X7R	50V	
2790	4822 122 33177	10nF 20% X7R	50V	
2791	4822 124 11569	4,7µF 20%	25V	
2792	4822 124 11569	4,7µF 20%	25V	
2793	5322 122 32481	15pF 5%	50V	
2794	4822 126 10002	100nF20%Y5V	25V	
2795	5322 122 34123	1nF10%X7R	50V	
2796	4822 124 11569	4,7µF 20%	25V	
2800	4822 126 13689	18pF 1%	63V	
2801	5322 122 32659	33pF 5%	50V	
2802	4822 126 14118	100nF -20+80%	50V	
2802	4822 126 10002	100nF20%Y5V	25V	
2803	4822 126 10002	100nF20%Y5V	25V	
2804	4822 124 23053	1µF20%	63V	
2805	4822 124 23027	47µF	6.3V	
2810	5322 122 33861	120pF10%	50V	
2811	5322 122 32531	100pF 5%	50V	
2831	5322 122 32481	15pF 5%	50V	
2850	4822 124 23052	100µF20%	16V	
2851	5322 122 32654	22nF10% X7R	63V	
2852	4822 124 23052	100µF20%	16V	
2853	5322 122 32654	22nF10% X7R	63V	
2854	4822 124 40786	2,2µF20%	63V	
2855	5322 122 32654	22nF10% X7R	63V	
2856	5322 122 32654	22nF10% X7R	63V	
2857	4822 126 13061	220nF20% Y5V	25V	
2858	4822 126 13061	220nF20% Y5V	25V	
2859	4822 126 13061	220nF20% Y5V	25V	
2860	4822 126 13061	220nF20% Y5V	25V	
2861	4822 126 13061	220nF20% Y5V	25V	
2862	4822 126 13061	220nF20% Y5V	25V	
2863	4822 126 13061	220nF20% Y5V	25V	
2864	4822 126 13061	220nF20% Y5V	25V	
2865	5322 126 10223	4,7nF10%X7R	63V	
2866	4822 124 11568	47µF 20%	16V	

⚠ ... Safety component, use only this type

2867	4822 124 22826	10µF	16V
2868	4822 126 13061	220nF20% Y5V	25V
2869	5322 126 10223	4,7nF10%X7R	63V
2870	4822 124 11568	47µF 20%	16V
2871	4822 124 22826	10µF	16V
2872	4822 124 22826	10µF	16V
2873	4822 124 22826	10µF	16V
2874	4822 124 22826	10µF	16V
2875	4822 124 22826	10µF	16V
2876	4822 124 22826	10µF	16V
2877	4822 124 22826	10µF	16V
2880	4822 124 22826	10µF	16V
2881	4822 124 22826	10µF	16V
2882	5322 126 10223	4,7nF10%X7R	63V
2883	5322 116 80853	560pF 5%	63V
2884	5322 126 10223	4,7nF10%X7R	63V
2885	5322 116 80853	560pF 5%	63V
2888	4822 124 22826	10µF	16V
2889	4822 126 10002	100nF20%Y5V	25V

RESISTORS

3000	4822 051 10102	1K00	2%	0,25W	
3001	4822 051 10102	1K00	2%	0,25W	
3002	4822 116 52228	680E	5%	0,5W	
3003	4822 116 52228	680E	5%	0,5W	
3004	4822 116 52228	680E	5%	0,5W	
3005	4822 116 52303	8K2	5%	0,5W	
3006	4822 116 52238	12K	5%	0,5W	
3007	4822 100 12157	10K	30%	POT	
3008	4822 116 83883	470E	5%	0,5W	
3010	4822 051 10102	1K00	2%	0,25W	
3011	4822 117 11449	2K2	1%	0,1W	
3012	4822 117 11449	2K2	1%	0,1W	
3013	4822 117 11721	1K3	2%	0.1W	
3014	4822 116 83903	4K7	2%	0.1W	
3015	4822 051 10102	1K00	2%	0,25W	
3016	4822 051 20822	8K20	5%	0,1W	
3017	4822 116 52249	1K8	5%	0,5W	
3018	4822 116 83883	470E	5%	0,5W	
3019	4822 051 20562	5K60	5%	0,1W	
3020	4822 051 20224	220K0	5%	0,1W	
3021	4822 050 11002	1K00	1%	0,4W	
3022	4822 050 11002	1K00	1%	0,4W	
3024	4822 051 20822	8K20	1%	0,1W	
3024	4822 051 20682	6K80	5%	0,1W	for 2/x
3027	4822 116 52264	27K	5%	0,5W	
3028	4822 051 20562	5K60	5%	0,1W	for 1 scart
3028	4822 051 20332	3K30	5%	0,1W	for 2 scart
3029	4822 051 20225	2M20	5%	0,1W	
3030	4822 116 52256	2K2	5%	0,5W	
3031	4822 116 52256	2K2	5%	0,5W	
3032	4822 117 11449	2K2	1%	0,1W	
3033	4822 116 52251	18K	5%	0,5W	
3034	4822 051 20153	15K00	5%	0,1W	
3035	4822 117 11449	2K2	1%	0,1W	
3036	4822 051 20471	470R0	5%	0,1W	
3045	4822 116 83876	270E	5%	0,5W	
3046	4822 050 11002	1K00	1%	0,4W	
3048	4822 116 83884	47K	5%	0,5W	
3050	4822 116 83872	220R	5%	0,5W	
3050	4822 116 52175	100E	5%	0,5W	
3051	4822 051 20224	220K0	5%	0,1W	
3052	4822 116 52175	100E	5%	0,5W	
3054	4822 117 11449	2K2	1%	0,1W	
3055	4822 117 10361	680R	1%	0,1W	
3080	4822 051 20568	5R60	5%	0,1W	
3081	4822 051 20561	560R0	5%	0,1W	
3082	4822 051 20101	100R0	5%	0,1W	
3083	4822 051 20472	4K70	5%	0,1W	
3084	4822 051 20472	4K70	5%	0,1W	
3085	4822 051 20112	1K10	5%	0,1W	
3086	4822 051 20331	330R0	5%	0,1W	
3087	4822 116 52234	100K	5%	0,5W	
3100	4822 116 52219	330E	5%	0,5W	
3101	4822 051 20332	3K30	5%	0,1W	
3102	4822 116 52231	820E	5%	0,5W	
3103	4822 116 52228	680E	5%	0,5W	
3104	4822 050 11002	1K00	1%	0,4W	
3105	4822 116 52222	390E	5%	0,5W	
3106	4822 116 52231	820E	5%	0,5W	
3107	4822 050 11002	1K00	1%	0,4W	
3109	4822 116 52195	47E	5%	0,5W	
3110	4822 116 52207	1K2	5%	0,5W	
3111	4822 116 52256	2K2	5%	0,5W	
3112	4822 051 10102	1K00	2%	0,25W	
3113	4822 051 20561	560R0	5%	0,1W	
3114	4822 117 10833	10K	1%	0,1W	
3115	4822 116 52251	18K	5%	0,5W	
3116	4822 051 10102	1K00	2%	0,25W	
3117	4822 116 52256	2K2	5%	0,5W	
3118	4822 116 52283	4K7	5%	0,5W	
3119	4822 116 52271	33K	5%	0,5W	
3120	4822 116 52303	8K20	5%	0,5W	
3121	4822 051 20182	1K80	5%	0,1W	
3122	4822 051 10102	1K00	2%	0,25W	
3123	4822 116 83864	10K	5%	0,5W	
3124	4822 116 52243	1K5	5%	0,5W	
3125	4822 117 11449	2K2	1%	0,1W	
3126	4822 051 10102	1K00	2%	0,25W	
3127	4822 117 11449	2K2	1%	0,1W	
3128	4822 117 11449	2K2	1%	0,1W	
3129	4822 051 10102	1K00	2%	0,25W	
3134	4822 117 11503	220R	1%	0.1W	
3135	4822 117 11503	220R	1%	0.1W	
3151	4822 051 20104	100K00	5%	0,1W	
3152	4822 051 20393	39K00	5%	0,1W	
3153	4822 117 10833	10K	1%	0,1W	
3154	4822 117 12605	27K	1%	0,1W	for 4/2
3154	4822 117 10354	22K	1%	0,1W	for 4/0
3154	4822 117 12141	14K	1%	0,1W	for 3/0
3154	4822 117 12342	18K	1%	0,1W	for 2/x
3155	4822 117 11383	12K	1%	0,1W	for 2/x
3155	4822 051 20153	15K00	5%	0,1W	for 4/x
3156	4822 051 20331	330R00	5%	0,1W	
3157	4822 051 20331	330R00	5%	0,1W	
3158	4822 051 20472	4K70	5%	0,1W	
3159	4822 100 12157	10K	30%	POT	
3160	4822 100 12157	10K	30%	POT	
3162	4822 051 20008	0R00 JUMP (0805)			
3163	4822 051 20008	0R00 JUMP (0805)			
3164	4822 051 20008	0R00 JUMP (0805)			
3165	4822 051 20008	0R00 JUMP (0805)			
3228	4822 116 83872	220E	5%	0,5W	
3229	4822 117 10833	10K	1%	0,1W	
3230	4822 117 10833	10K	1%	0,1W	
3231	4822 116 52175	100E	5%	0,5W	
3232	4822 116 52175	100E	5%	0,5W	
3233	4822 116 83864	10K	5%	0,5W	
3234	4822 116 83864	10K	5%	0,5W	
3235	4822 116 83864	10K	5%	0,5W	
3238	4822 116 83864	10K	5%	0,5W	
3240	4822 116 52297	68K	5%	0,5W	
3241	4822 051 20683	68K00	5%	0,1W	
3242	4822 051 20683	68K00	5%	0,1W	
3243	4822 051 20683	68K00	5%	0,1W	
3244	4822 050 11002	1K00	1%	0,4W	
3245	4822 051 20183	18K00	5%	0,1W	
3250	4822 051 20153	15K00	5%	0,1W	
3252⚠	4822 117 11593	22E	5%		
3253	4822 050 24708	4R70	1%	0,6W	
3254	4822 050 24708	4R70	1%	0,6W	
3265	4822 116 83864	10K	5%	0,5W	
3270	4822 117 11503	220R	1%	0.1W	
3271	4822 117 11503	220R	1%	0.1W	
3273	4822 117 11503	220R	1%	0.1W	
3297	4822 051 20562	5K60	5%	0,1W	
3300	4822 116 52175	100E	5%	0,5W	
3301	4822 116 52175	100E	5%	0,5W	

⚠ ... Safety component, use only this type

Motherboard QMB PAL, SECAM, MONO, STEREO

3302	4822 116 52175	100E	5%	0,5W
3303	4822 116 83883	470E	5%	0,5W
3304	4822 050 11002	1K00	1%	0,4W
3305	4822 116 52283	4K7	5%	0,5W
3312	4822 116 52249	1K8	5%	0,5W
3313	4822 116 83884	47K	5%	0,5W
3350	4822 117 10833	10K	1%	0,1W
3351	4822 051 20223	22K00	5%	0,1W
3352	4822 051 20562	5K60	5%	0,1W
3353	4822 117 10833	10K	1%	0,1W
3354	4822 117 11449	2K2	1%	0,1W
3355	4822 051 20822	8K20	5%	0,1W
3356	4822 051 20223	22K00	5%	0,1W
3357	4822 051 20472	4K70	5%	0,1W
3358	4822 117 11149	82K	1%	0,1W
3359	4822 051 20471	470R00	5%	0,1W
3360	4822 051 20689	68R00	5%	0,1W
3361⚠	4822 052 10479	47R00	5%	0,33W
3362	4822 051 20472	4K70	5%	0,1W
3363	4822 050 21208	1R20	1%	0,6W
3365	4822 116 83874	220K	5%	0,5W
3369	4822 116 83882	39K	5%	0,5W
3370	4822 116 83882	39K	5%	0,5W
3374	4822 051 20271	270R00	5%	0,1W
3375	4822 051 10102	1K00	2%	0,25W
3376	4822 051 20008	0R00 JUMP (0805)		
3377	4822 051 20472	4K70	5%	0,1W
3378	4822 051 20272	2K70	5%	0,1W
3379	4822 101 11383	470E	30%	POT
3380	4822 051 10102	1K00	2%	0,25W
3381	4822 051 20104	100K00	5%	0,1W
3382	4822 117 10833	10K	1%	0,1W
3383	4822 116 83874	220K	5%	0,5W
3384⚠	4822 052 10101	100R00	5%	0,33W
3385	4822 116 52269	3K30	1%	0,4W
3386	4822 116 52219	330E	1%	0,4W
3387	4822 050 11002	1K00	1%	0,4W
3388	4822 050 11002	1K00	1%	0,4W
3389	4822 117 11449	2K2	1%	0,1W
3390	4822 051 20224	220K00	5%	0,1W
3391	4822 051 20224	220K00	5%	0,1W
3392	4822 053 21335	3M30	5%	0,5W
3393	4822 053 21335	3M30	5%	0,5W
3394	4822 116 52256	2K2	5%	0,5W
3395	4822 116 52257	22K	5%	0,5W
3396	4822 116 52257	22K	5%	0,5W
3400	4822 116 83864	10K	5%	0,5W
3401	4822 116 83864	10K	5%	0,5W
3402	4822 050 11002	1K00	1%	0,4W
3403	4822 116 52256	2K2	5%	0,5W
3404	4822 116 83864	10K	5%	0,5W
3405	4822 116 83876	270E	5%	0,5W
3406	4822 116 83864	10K	5%	0,5W
3407	4822 116 83864	10K	5%	0,5W
3408	4822 116 52256	2K2	5%	0,5W
3410	4822 051 20472	4K70	5%	0,1W
3411	4822 116 83864	10K	5%	0,5W
3412	4822 116 52249	1K8	5%	0,5W
3413	4822 050 11002	1K00	1%	0,4W
3414⚠	4822 052 10109	10R00	5%	0,33W
3415⚠	4822 052 10109	10R00	5%	0,33W
3416	4822 116 52257	22K	5%	0,5W
3417	4822 116 52283	4K7	5%	0,5W
3418	4822 050 11002	1K00	1%	0,4W
3419	4822 051 20472	4K70	5%	0,1W
3420	4822 117 10833	10K	1%	0,1W
3421	4822 116 83864	10K	5%	0,5W
3423	4822 116 83876	270R	5%	0,5W
3424	4822 116 52256	2K2	5%	0,5W
3430	4822 116 52249	1K8	5%	0,5W
3431	4822 116 52276	3K9	5%	0,5W
3432	4822 116 83864	10K	5%	0,5W
3433	4822 116 52256	2K2	5%	0,5W
3434	4822 116 52257	22K	5%	0,5W
3435	4822 116 83864	10K	5%	0,5W
3436	4822 050 11002	1K00	1%	0,4W
3437	4822 116 83961	6K8	5%	
3438	4822 051 20472	4K70	5%	0,1W
3440⚠	4822 052 10228	2R20	5%	0,33W
3441	4822 116 80176	1E	5%	0,5W
3442	4822 116 52304	82K	5%	0,5W
3443	4822 116 52257	22K	5%	0,5W
3444	4822 116 52276	3K9	5%	0,5W
3445	4822 116 83864	10K	5%	0,5W
3446	4822 116 52257	22K	5%	0,5W
3447	4822 116 52257	22K	5%	0,5W
3448	4822 116 83864	10K	5%	0,5W
3449	4822 117 10833	10K	1%	0,1W
3450	4822 116 52256	2K2	5%	0,5W
3451	4822 116 83864	10K	5%	0,5W
3452	4822 116 52263	2K7	5%	0,5W
3453	4822 116 52283	4K7	5%	0,5W
3454	4822 116 52283	4K7	5%	0,5W
3455	4822 116 52283	4K7	5%	0,5W
3456	4822 117 10833	10K	1%	0,1W
3457	4822 050 11002	1K00	1%	0,4W
3458	4822 051 20223	22K00	5%	0,1W
3459	4822 116 83876	270E	5%	0,5W
3460	4822 116 83884	47K	5%	0,5W
3461	4822 051 20472	4K70	5%	0,1W
3462	4822 051 20563	56K00	5%	0,1W
3463	4822 116 52283	4K7	5%	0,5W
3464	4822 116 52256	2K2	5%	0,5W
3466	4822 116 83864	10K	5%	0,5W
3469	4822 116 83876	270E	5%	0,5W
3470	4822 116 52264	27K	5%	0,5W
3471	4822 116 52222	390E	5%	0,5W
3472	4822 116 52264	27K	5%	0,5W
3473	4822 116 52222	390E	5%	0,5W
3474	4822 116 83864	10K	5%	0,5W
3475	4822 116 52289	5K6	5%	0,5W
3476	4822 116 52222	390E	5%	0,5W
3477	4822 116 52283	4K7	5%	0,5W
3478	4822 051 20104	100K00	5%	0,1W
3479	4822 116 52283	4K7	5%	0,5W
3480	4822 116 83884	47K	5%	0,5W
3481	4822 116 52256	2K2	5%	0,5W
3482	4822 116 52257	22K	5%	0,5W
3483	4822 116 83864	10K	5%	0,5W
3484	4822 116 52283	4K7	5%	0,5W
3488	4822 051 20471	470R00	5%	0,1W
3489	4822 116 52283	4K7	5%	0,5W
3490	4822 116 83872	220R	5%	0,5W
3491	4822 116 83884	47K	5%	0,5W
3492	4822 051 20473	47K00	5%	0,1W
3493	4822 051 20225	2M20	5%	0,1W
3494	4822 051 20104	100K00	5%	0,1W
3495	4822 051 20104	100K00	5%	0,1W
3496	4822 051 20472	4K70	5%	0,1W
3497	4822 051 20472	4K70	5%	0,1W
3498	4822 051 20472	4K70	5%	0,1W
3499	4822 116 52283	4K7	5%	0,5W
3501	4822 051 10102	1K00	2%	0,25W
3502	4822 051 10102	1K00	2%	0,25W
3503	4822 051 10102	1K00	2%	0,25W
3505	4822 051 20759	75R00	5%	0,1W
3509	4822 051 20008	0R00 JUMP (0805)		
3510	4822 051 20008	0R00 JUMP (0805)		
3512	4822 051 20682	6K80	5%	0,1W
3513	4822 116 83872	220E	5%	0,5W
3514	4822 116 83961	6K80	5%	
3515	4822 051 20682	6K80	5%	0,1W
3516	4822 117 11503	220R	1%	0.1W
3517	4822 116 52234	100K	5%	0,5W
3518	4822 116 52234	100K	5%	0,5W
3519	4822 051 20822	8K20	5%	0,1W
3520	4822 117 10353	150R	1%	0,1W
3521	4822 116 83961	6K8	5%	
3522	4822 051 20821	820R00	5%	0,1W
3523	4822 051 20008	0R00 JUMP (0805)		

⚠ ... Safety component, use only this type

Motherboard QMB PAL, SECAM, MONO, STEREO

3524	4822 051 20759	75R00	5%	0,1W
3525	4822 051 20822	8K20	5%	0,1W
3526	4822 117 11449	2K20	1%	0,1W
3527	4822 051 20472	4K70	5%	0,1W
3528	4822 116 83884	47K	5%	0,5W
3529	4822 051 20759	75R00	5%	0,1W
3530	4822 051 20472	4K70	5%	0,1W
3531	4822 051 20101	100R00	5%	0,1W
3532	4822 051 20101	100R00	5%	0,1W
3533	4822 051 20759	75R00	5%	0,1W
3534	4822 051 20008	0R00 JUMP (0805)		
3535	4822 117 11503	220E	1%	0.1W
3536	4822 117 11503	220E	1%	0.1W
3537	4822 116 83872	220E	5%	0,5W
3538	4822 116 83961	6K8	5%	
3539	4822 116 83961	6K8	5%	
3540	4822 117 11503	220E	1%	0.1W
3542	4822 117 11503	220E	1%	0.1W
3543	4822 051 20471	470R00	5%	0,1W
3544	4822 117 11503	220R	1%	0.1W
3545	4822 116 52256	2K2	5%	0,5W
3546	4822 116 52256	2K2	5%	0,5W
3547	4822 051 20479	47R00	5%	0,1W
3548	4822 051 20682	6K80	5%	0,1W
3549	4822 051 20101	100R00	5%	0,1W
3550	4822 051 20105	1M00	5%	0,1W
3551	4822 051 20105	1M00	5%	0,1W
3552	4822 051 20682	6K80	5%	0,1W
3553	4822 051 20101	100R00	5%	0,1W
3554	4822 051 20101	100R00	5%	0,1W
3555	4822 051 20008	0R00 JUMP (0805)		
3556	4822 051 20474	470K00	5%	0,1W
3557	4822 051 20104	100K00	5%	0,1W
3560	4822 051 20008	0R00 JUMP (0805)		
3561	4822 051 20472	4K70	5%	0,1W
3562	4822 051 20473	47K00	5%	0,1W
3563	4822 051 20822	8K20	5%	0,1W
3570	4822 116 83864	10K	5%	0,5W
3571	4822 117 11383	12K	1%	0,1W
3600	4822 116 52257	22K	5%	0,5W
3601	4822 117 10833	10K	1%	0,1W
3602	4822 051 20472	4K70	5%	0,1W
3603	4822 051 20101	100R00	5%	0,1W
3604	4822 116 52257	22K	5%	0,5W
3605	4822 117 11449	2K2	1%	0,1W
3606	4822 116 52195	47E	5%	0,5W
3607	4822 051 20394	390K00	5%	0,1W
3608	4822 117 11383	12K	1%	0,1W
3609	4822 051 20822	8K20	5%	0,1W
3610	4822 117 11449	2K2	1%	0,1W
3611	4822 051 20101	100R00	5%	0,1W for mono
3611	4822 051 20681	680R00	5%	0,1W for stereo
3612	4822 117 11449	2K2	1%	0,1W
3615	4822 051 20101	100R00	5%	0,1W
3618	4822 100 12159	100K	30%	POT
3619	4822 051 20158	1R50	5%	0,1W
3620	4822 051 20473	47K00	5%	0,1W
3622	4822 051 20335	3M30	5%	0,1W
3623	4822 117 10833	10K	1%	0,1W
3624	4822 051 20332	3K30	5%	0,1W
3625	4822 051 20339	33R00	5%	0,1W
3626	4822 051 20224	220K00	5%	0,1W
3627	4822 051 20563	56K00	5%	0,1W
3638	4822 051 20109	10R00	5%	0,1W
3655	4822 051 20681	680R00	5%	0,1W
3656	4822 116 83961	6K8	5%	
3657	4822 051 20391	390R00	5%	0,1W
3702	4822 051 20101	100R00	5%	0,1W
3703	4822 051 20101	100R00	5%	0,1W
3704	4822 051 20681	680R00	5%	0,1W
3705	4822 051 20223	22K00	5%	0,1W
3706	4822 051 20681	680R00	5%	0,1W
3707	4822 051 20101	100R00	5%	0,1W
3708	4822 051 20101	100R00	5%	0,1W
3709	4822 051 20101	100R00	5%	0,1W
3712	4822 051 20272	2K70	5%	0,1W
3715	4822 051 20122	1K20	5%	0,1W
3723	4822 051 20224	220K00	5%	0,1W
3725	4822 051 20822	8K20	5%	0,1W
3726	4822 051 20273	27K00	5%	0,1W
3729	4822 051 20391	390R00	5%	0,1W
3730	4822 051 20183	18K00	5%	0,1W
3731	4822 051 20183	18K00	5%	0,1W
3732	4822 051 20391	390R00	5%	0,1W
3735	4822 117 11448	180R	1%	0,1W for mono SEC
3735	4822 051 20391	390R00	5%	0,1W
3736	4822 051 20562	5K60	5%	0,1W
3737	4822 051 20392	3K90	5%	0,1W
3739	4822 051 20681	680R00	5%	0,1W
3742	4822 100 12158	22K	30%	POT
3744	4822 051 20154	150K00	5%	0,1W
3747	4822 051 20391	390R00	5%	0,1W for SECAM
3747	4822 051 20331	330R00	5%	0,1W for SEC DK
3747	4822 051 20271	270E	5%	0,1W for PAL
3748	4822 100 12156	4K7	30%	POT for PLL adj.
3748	4822 100 12158	22K	30%	POT for Bd. 1 adj.
3749	4822 051 20681	680R00	5%	0,1W
3750	4822 051 20331	330R00	5%	0,1W
3760	4822 051 10102	1K00	2%	0,25W
3760	4822 051 20821	820R00	5%	0,1W for PAL I
3761	4822 051 10102	1K00	2%	0,25W
3762	4822 051 10102	1K00	2%	0,25W
3764	4822 051 10102	1K00	2%	0,25W for PAL
3764	4822 051 20821	820R00	5%	0,1W for SECAM
3765	4822 051 20562	5K60	5%	0,1W
3766	4822 051 20473	47K00	5%	0,1W
3767	4822 051 20472	4K70	5%	0,1W
3768	4822 051 20104	100K00	5%	0,1W
3769	4822 051 20472	4K70	5%	0,1W
3770	4822 051 20104	100K00	5%	0,1W
3771	4822 051 20472	4K70	5%	0,1W
3772	4822 051 20104	100K00	5%	0,1W
3773	4822 051 20104	100K00	5%	0,1W
3780	4822 051 20101	100R00	5%	0,1W
3781	4822 051 20101	100R00	5%	0,1W
3782	4822 051 20333	33K00	5%	0,1W
3790	4822 051 20472	4K70	5%	0,1W
3791	4822 051 20562	5K60	5%	0,1W
3792	4822 051 20472	4K70	5%	0,1W
3793	4822 051 20562	5K60	5%	0,1W
3805	4822 051 20101	100R00	5%	0,1W
3807	4822 051 20479	47R00	5%	0,1W
3808	4822 051 20479	47R00	5%	0,1W
3813	4822 051 20472	4K70	5%	0,1W
3815	4822 117 10833	10K	1%	0,1W
3816	4822 117 10833	10K	1%	0,1W
3817	4822 117 10833	10K	1%	0,1W
3818	4822 051 20153	15K00	5%	0,1W
3819	4822 117 10833	10K	1%	0,1W
3820	4822 117 10833	10K	1%	0,1W
3821	4822 117 10833	10K	1%	0,1W
3822	4822 051 20153	15K00	5%	0,1W
3823	4822 117 10833	10K	1%	0,1W
3824	4822 117 11449	2K2	1%	0,1W
3825	4822 051 20472	4K70	5%	0,1W
3826	4822 051 20153	15K00	5%	0,1W
3827	4822 051 20104	100K00	5%	0,1W
3828	4822 117 10833	10K	1%	0,1W
3829	4822 051 20008	0R00 JUMP (0805)		
3850	4822 117 12708	39K	1%	0,1W
3851	4822 051 20473	47K00	5%	0,1W
3852	4822 051 20392	3K90	5%	0,1W
3853	4822 051 20473	47K00	5%	0,1W
3854	4822 051 20392	3K90	5%	0,1W
3855	4822 051 20104	100K00	5%	0,1W
3856	4822 051 20104	100K00	5%	0,1W
3857	4822 051 20335	3M30	5%	0,1W
3858	4822 117 11449	2K2	1%	0,1W
3860	4822 051 20101	100R00	5%	0,1W
3861	4822 051 20101	100R00	5%	0,1W

⚠ ... Safety component, use only this type

Motherboard QMB PAL, SECAM, MONO, STEREO

3862	4822 051 20104	100K00	5%	0,1W	
3863	4822 051 20104	100K00	5%	0,1W	
3864	4822 051 20472	4K70	5%	0,1W	
3865	4822 051 20472	4K70	5%	0,1W	
3866	4822 051 20475	4M70	5%	0,1W	
3867	4822 051 20475	4M70	5%	0,1W	
3870	4822 051 20472	4K70	5%	0,1W	
3871	4822 051 20223	22K00	5%	0,1W	
3901	4822 051 20008	0R00 JUMP (0805)			
3902	4822 051 20008	0R00 JUMP (0805)			
3903	4822 051 20008	0R00 JUMP (0805)			
3905	4822 051 20008	0R00 JUMP (0805)			
3906	4822 051 20008	0R00 JUMP (0805)			
3907	4822 051 20008	0R00 JUMP (0805)			
3908	4822 051 20008	0R00 JUMP (0805)			
3910	4822 051 20008	0R00 JUMP (0805)			
3911	4822 051 20008	0R00 JUMP (0805)			
3912	4822 051 20008	0R00 JUMP (0805)			
3913	4822 051 20008	0R00 JUMP (0805)			
3915	4822 051 20008	0R00 JUMP (0805)			
3916	4822 051 20008	0R00 JUMP (0805)			
3917	4822 051 20008	0R00 JUMP (0805)			
3918	4822 051 20008	0R00 JUMP (0805)			
3919	4822 051 20008	0R00 JUMP (0805)			
3922	4822 051 20008	0R00 JUMP (0805)			
3923	4822 051 20008	0R00 JUMP (0805)			
3924	4822 051 20008	0R00 JUMP (0805)			
3925	4822 051 20008	0R00 JUMP (0805)			
3926	4822 051 20008	0R00 JUMP (0805)			
3927	4822 051 20008	0R00 JUMP (0805)			
3928	4822 051 20008	0R00 JUMP (0805)			
3929	4822 051 20008	0R00 JUMP (0805)			
3930	4822 051 20008	0R00 JUMP (0805)			
3931	4822 051 20008	0R00 JUMP (0805)			
3941	4822 051 20008	0R00 JUMP (0805)			
3942	4822 051 20008	0R00 JUMP (0805)			
3943	4822 051 20008	0R00 JUMP (0805)			
3944	4822 051 20008	0R00 JUMP (0805)			
3945	4822 051 20008	0R00 JUMP (0805)			
3946	4822 051 20008	0R00 JUMP (0805)			
3947	4822 051 20008	0R00 JUMP (0805)			
3950	4822 051 20008	0R00 JUMP (0805)			
3951	4822 051 20008	0R00 JUMP (0805)			
3956	4822 051 20008	0R00 JUMP (0805)			
3960	4822 051 20008	0R00 JUMP (0805)			
3961	4822 051 20008	0R00 JUMP (0805)			
3962	4822 051 20008	0R00 JUMP (0805)			
3965	4822 051 20008	0R00 JUMP (0805)			
3966	4822 051 20008	0R00 JUMP (0805)			
3967	4822 051 20008	0R00 JUMP (0805)			
3970	4822 051 20008	0R00 JUMP (0805)			
3972	4822 051 20008	0R00 JUMP (0805)			
3973	4822 051 20008	0R00 JUMP (0805)			
3984	4822 051 20008	0R00 JUMP (0805)			
3985	4822 051 20008	0R00 JUMP (0805)			
3986	4822 051 20008	0R00 JUMP (0805)			
3988	4822 051 20008	0R00 JUMP (0805)			
3989	4822 051 20008	0R00 JUMP (0805)			
3990	4822 051 20008	0R00 JUMP (0805)			
3998	4822 051 20008	0R00 JUMP (0805)			
3999	4822 051 20008	0R00 JUMP (0805)			
4501	4822 117 12708	39K00	5%	0,1W	
4505	4822 117 10833	10K	1%	0,1W	
4512	4822 117 12708	39K00	5%	0,1W	
4517	4822 051 20182	1K80	5%	0,1W	for DOWN
4517	4822 117 10833	10K	1%	0,1W	for STBY
4517	4822 051 20472	4K70	5%	0,1W	for UP
4518	4822 117 12708	39K00	5%	0,1W	
4523	4822 117 10833	10K	1%	0,1W	
4545	4822 117 10833	10K	1%	0,1W	
4563	4822 117 10833	10K	1%	0,1W	
4569	4822 051 20182	1K80	5%	0,1W	
4579	4822 051 20182	1K80	5%	0,1W	
4580	4822 117 12708	39K00	5%	0,1W	
4583	4822 117 10833	10K00	1%	0,1W	for STBY
4583	4822 051 20472	4K70	5%	0,1W	for UP
4583	4822 051 20182	1K80	5%	0,1W	for DOWN
4591	4822 117 12708	39K00	5%	0,1W	
4592	4822 117 12708	39K00	5%	0,1W	
4595	4822 117 12708	39K00	5%	0,1W	
4596	4822 117 12708	39K00	5%	0,1W	for REC
4596	4822 051 20008	0R00 JUMP (0805)			for EJECT
4609	4822 051 20182	1K80	5%	0,1W	
4610	4822 117 12708	39K00	5%	0,1W	
4628	4822 117 12708	39K00	5%	0,1W	
4653	4822 051 20182	1K80	5%	0,1W	
4659	4822 051 20472	4K70	5%	0,1W	
4660	4822 051 20472	4K70	5%	0,1W	for REW
4660	4822 051 20182	1K80	5%	0,1W	for STOP
4665	4822 051 20472	4K70	5%	0,1W	for UP
4665	4822 117 12708	39K00	5%	0,1W	for INST.
4671	4822 051 20008	0R00 JUMP (0805)			for ST/EJ
4671	4822 051 20182	1K80	5%	0,1W	for DOWN
4672	4822 051 20183	18K00	5%	0,1W	
4677	4822 051 20182	1K80	5%	0,1W	for DOWN
4677	4822 051 20008	0R00 JUMP (0805)			for ST/EJ
4678	4822 117 10833	10K	1%	0,1W	
4683	4822 051 20008	0R00 JUMP (0805)			
4684	4822 051 20472	4K70	5%	0,1W	for REW
4684	4822 117 12708	39K00	5%	0,1W	for REC
4703	4822 117 12708	39K00	5%	0,1W	
4716	4822 051 20472	4K70	5%	0,1W	
4728	4822 051 20183	18K00	5%	0,1W	
4739	4822 051 20008	0R00 JUMP (0805)			
4742	4822 117 10833	10K	1%	0,1W	
4745	4822 051 20472	4K70	5%	0,1W	for for UP
4745	4822 051 20008	0R00 JUMP (0805)			for ST/EJ
4746	4822 051 20472	4K70	5%	0,1W	for REW
4746	4822 051 20183	18K00	5%	0,1W	for PLAY
4752	4822 051 20472	4K70	5%	0,1W	
4757	4822 051 20008	0R00 JUMP (0805)			
4758	4822 051 20183	18K00	5%	0,1W	
4758	4822 117 10833	10K	1%	0,1W	
4763	4822 117 12708	39K00	5%	0,1W	
4764	4822 117 10833	10K	1%	0,1W	for WIND
4764	4822 051 20183	18K00	5%	0,1W	for PLAY
4764	4822 051 20472	4K70	5%	0,1W	for REW
4772	4822 117 10833	10K	1%	0,1W	for WIND
4772	4822 051 20472	4K70	5%	0,1W	for REW
4787	4822 051 20008	0R00 JUMP (0805)			

COILS

5000	4822 157 11234	10µH	5%	
5001	4822 152 20677	10µH		
5002	4822 152 20677	10µH		
5004	4822 157 11142	47µH	5%	
5005	4822 157 11145	150µH	5%	
5020	4822 157 10972	15µH	5%	
5026	4822 157 11228	LAN02TB101J		
5036	4822 157 11149	56µH	5%	
5080⚠	4822 157 11226	47µH	5%	
5100	4822 157 63661	FIL LC VAR 4M286 5VS		
5101	4822 157 10972	15µH	5%	
5102	4822 157 11149	56µH	5%	
5103	4822 157 63661	FIL LC VAR 4M286 5VS		
5104	4822 157 11227	150µH	5%	
5105	4822 157 11227	150µH	5%	
5106	4822 157 11151	330µH	5%	
5107	4822 157 11228	LAN02TB101J		
5108	4822 157 63659	FIL LC VAR 1G072 5V2		
5111	4822 157 11229	15µH	5%	
5112	4822 157 10972	15µH	5%	
5113	4822 157 11145	150µH	5%	
5114	4822 157 10972	15µH	5%	
5115	4822 157 63717	6,8µH		
5130	4822 157 71206	BLM21A10PT		
5150⚠	4822 157 53906	47µH		
5200	4822 152 20677	10µH		

5300⚠	4822 157 53005	
5350	4822 157 51462	10µH
5351	4822 157 71461	22µH 10%
5352⚠	4822 157 10454	
5353⚠	4822 146 10786	SRW32ES-E01
5354	4822 157 51462	10µH
5355⚠	4822 157 53005	
5358	4822 157 60147	2,2µH
5361	4822 157 52286	22µH
5368	4822 157 60147	2,2µH
5400	4822 152 20677	10µH
5402	4822 152 20677	10µH
5601	4822 157 11249	10.000UF 5%
5602	4822 157 11151	330µH 5%
5603	4822 157 53531	
5604	4822 157 11251	3,3µH 10%
5605	4822 157 71206	BLM21A10PT
5700	4822 157 71206	BLM21A10PT
5702	4822 152 20677	10µH
5703	4822 152 20677	10µH
5705	4822 152 20677	10µH
5720	4822 157 11231	LAN02TB1R0J
5721	4822 157 70877	H292ONS-6785NK
5725	4822 157 70877	H292ONS-6785NK
5726	4822 051 20008	0R00 JUMP (0805)
5740	4822 157 11232	12µH 5% for SECAM LL'
5740	4822 157 11229	15µH 5% for PAL
5741	4822 157 11223	39µH 5%
5780	4822 157 70038	
5800	4822 157 11233	LAN02TB330J
5801	4822 152 20677	10µH
5810	4822 157 11234	10µH 5%
5831	4822 157 11235	LANO2TB220J

DIODES

6100	4822 130 32778	1SS133
6135	4822 130 34197	BZX79-B12
6250	4822 130 83514	MTZJ12C
6299	4822 130 10869	DIODE SIGN RB441
6350	4822 130 30842	BAV21
6351	4822 130 31983	BAT85
6352	4822 130 42488	BYD33D
6353	4822 130 42488	BYD33D
6354	4822 130 80858	1N5062
6355	4822 130 42488	BYD33D
6356	4822 130 42488	BYD33D
6357	4822 130 10871	DIODE RECT SBYV2
6358	5322 130 31938	BYV27-200
6359	4822 130 32715	SB340
6359	4822 130 83909	BYW98-200RL
6360	4822 130 83147	DF06M
6371	4822 130 42488	BYD33D
6372	4822 130 34142	BZX79-B33
6460	4822 130 10231	SET: 2x Sens + 1x Led
6500	4822 130 34197	BZX79-B12
6501	4822 130 34197	BZX79-B12
6502	4822 130 34197	BZX79-B12
6509	4822 130 83514	MTZJ12C
6510	4822 130 83514	MTZJ12C
6511	4822 130 10884	MTZJ18C
6516	4822 130 34278	BZX79-B6V8
6530	4822 130 10654	BAT254
6601	4822 130 30861	BZX79-B7V5
6760	4822 130 10414	BA792
6761	4822 130 10414	BA792

TRANSISTORS & IC's

7000	4822 130 42353	BSF19-F2
7001	4822 130 10872	MMUN2112LT1
7002	4822 130 60511	BC847B
7003	4822 209 15526	LC89980M
7004	4822 130 42353	BSF19-F2
7005	5322 130 60508	BC857B
7006	4822 130 60511	BC847B
7007	4822 209 15527	LA71525M
7008	5322 130 60508	BC857B
7009	4822 130 10872	MMUN2112LT1
7011	4822 130 60511	BC847B
7020	4822 130 63732	MMUN2212
7021	5322 130 60508	BC857B
7080	4822 209 90421	STV5712
7085	4822 130 60511	BC847B
7100	4822 130 60511	BC847B
7101	4822 130 60511	BC847B
7102	4822 209 73852	PMBT2369
7103	4822 130 60511	BC847B
7104	4822 130 63732	MMUN2212
7105	5322 130 60508	BC857B
7106	4822 130 60511	BC847B
7110	4822 209 90189	TDA4722/V2
7150	4822 209 13121	STV5742
7151	4822 209 15548	STV5744AD
7153	4822 130 63732	MMUN2212
7201	4822 209 15516	TMP87CS71F QDCE1-xP
7201	4822 209 15517	TMP87CS71F QDCE2-xU
7201	4822 209 15518	TMP87CS71F QDCE3-xU
7201	4822 209 15521	TMP87CS71F QDCH1-xP
7201	4822 209 15519	TMP87CS71F QDCH2-xU
7201	4822 209 15528	TMP87CS71F QDCH3-xU
7201	4822 209 15549	TMP87CS71F QDCH4-xU
7201	4822 209 15573	TMP87CS71F QDCH5-xU
7202	4822 135 00115	25U39113SA
7203	4822 212 30842	TFMS5360
7231	4822 130 63732	MMUN2212
7300	4822 209 13126	TDA5241
7301	4822 130 10872	MMUN2112LT1
7350⚠	4822 130 63794	STP3NA60
7351⚠	4822 209 32126	SOC1012T
7352	4822 209 81397	TL431CLpST
7353	4822 130 10214	STD17N06
7354	4822 209 90025	MC44603P
7356	4822 130 60511	BC847B
7357	4822 130 10214	STD17N06
7358	4822 130 40995	BD438
7359	4822 130 60511	BC847B
7400	4822 209 15529	TMP91C642AF QTDP2-xU
7420	4822 209 90313	L4812CV for stereo
7420	4822 209 81726	MC7812CT for mono
7440	4822 209 30146	L2722
7455	4822 130 10872	MMUN2112LT1
7456	4822 130 60511	BC847B
7457	4822 130 60511	BC847B
7458	4822 130 60511	BC847B
7460	4822 209 30836	SAA1310/N2
7461	4822 130 10231	SET: 2x Sens + 1x Led
7462	4822 130 10231	SET: 2x Sens + 1x Led
7463	4822 130 41344	BC337-40
7464	4822 130 10233	TCRT5000L
7465	4822 130 10233	TCRT5000L
7466	4822 130 10234	TCST1030L
7467	4822 130 60511	BC847B
7468	4822 130 60511	BC847B
7469	4822 130 60511	BC847B
7500	4822 130 60511	BC847B
7501	5322 130 60508	BC857B
7502	4822 130 60511	BC847B
7505	4822 130 63732	MMUN2212
7506	4822 130 10872	MMUN2112LT1
7507	4822 209 90016	STV6400
7510	5322 130 42136	BC848C
7511	4822 130 42615	BC817-40
7512	5322 130 42136	BC848C
7513	5322 209 14481	HEF4053BT
7513	5322 209 14481	HEF4053BT
7540	4822 209 15504	SDA5650 for VPS/PDC
7540	4822 209 32728	SDA5642 for VPS only

⚠ Safety component, use only this type

7600	4822 130 60373	BC856B
7601	5322 130 60159	BC846B
7602	5322 130 60159	BC846B
7603	4822 130 60511	BC847B
7604	4822 130 41715	BC328-40
7609	4822 130 42615	BC817-40
7720	4822 209 90288	TDA9800T/V3
7721	4822 209 90018	TDA9812T for SECAM mono
7721	4822 209 90431	TDA9813T/V2 for PAL FM stereo
7721	4822 209 90452	TDA9814T/V3 for SECAM stereo
7722	5322 209 14481	HEF4053BT
7723	5322 130 60508	BC857B
7724	5322 130 42136	BC848C
7725	4822 130 60511	BC847B
7726	4822 130 63732	MMUN2212
7728	4822 130 10802	BSS138
7729	4822 130 60511	BC847B
7730	4822 130 60511	BC847B
7731	4822 130 63732	MMUN2212
7780	4822 209 32501	TDA9840T/V2
7800	4822 209 15524	LC74781-9663
7810	4822 130 42353	BSF19-F2
7850	4822 209 15525	TDA9604H/N1
7851	4822 130 60511	BC847B
7852	4822 130 60511	BC847B
7860	4822 209 60177	LM339D
7890	4822 209 32283	ST24C08CB1 for GAMESTAR
7890	4822 209 32709	ST24C04CB1

MISCELLANEOUS

1700⚠	4822 071 52501	Fuse	250mA
1710	4822 242 10433	Crystal	8,192 MHz
1970	4822 265 10943	CONN	11P

CAPACITORS

2700	4822 122 33172	390pF	5%	50V
2701	5322 122 32448	10pF	5%	50V
2703	4822 126 10002	100nF	20%	25V
2704	4822 122 33575	220pF	5%	50V
2705	4822 124 22826	10µF		16V
2706	4822 124 22826	10µF		16V
2707	4822 126 13061	220nF	20%	25V
2708	5322 122 32654	22nF	10%	63V
2709	5322 122 32531	100pF	5%	50V
2710	5322 122 32531	100pF	5%	50V
2714	4822 124 23027	47µF		6.3V
2716	4822 124 23027	47µF		6.3V
2718	4822 126 10002	100nF	20%	25V
2719	4822 122 33175	2,2nF	20%	50V
2720	4822 122 33175	2,2nF	20%	50V
2721	4822 126 13061	220nF	20%	25V
2722	4822 122 33175	2,2nF	20%	50V
2723	4822 122 33175	2,2nF	20%	50V
2725	4822 124 23053	1µF	20%	63V
2726	4822 122 33797	47nF	20%	50V
2727	4822 124 23027	47µF		6.3V
2728	4822 126 10002	100nF	20%	25V
2729	4822 124 22826	10µF		16V
2731	4822 124 22826	10µF		16V
2732	4822 126 10002	100nF	20%	25V
2733	4822 124 23027	47µF		6.3V
2734	5322 122 32654	22nF	10%	63V
2736	4822 126 10002	100nF	20%	25V
2752	4822 126 13061	220nF	20%	25V
2753	4822 126 13061	220nF	20%	25V

RESISTORS

3700	4822 051 10102	1K00	2%	0,25W
3701	4822 051 20101	100R00	5%	0,1W
3702	4822 051 20223	22K00	5%	0,1W
3703	4822 051 20104	100K00	5%	0,1W
3704	4822 117 11449	2K2	1%	0,1W
3705	4822 051 20392	3K90	5%	0,1W
3707	4822 116 52276	3K9	5%	0,5W
3708	4822 117 11449	2K2	1%	0,1W
3710	4822 051 20334	330K00	5%	0,1W
3711	4822 116 52175	100E	5%	0,5W
3712	4822 116 52175	100E	5%	0,5W
3713	4822 051 20182	1K80	5%	0,1W
3714	4822 051 20333	33K00	5%	0,1W
3715	4822 117 10833	10K	1%	0,1W
3720	4822 117 10833	10K	1%	0,1W
3721	4822 117 10833	10K	1%	0,1W
3722	4822 117 10833	10K	1%	0,1W
3723	4822 117 10833	10K	1%	0,1W
3790	4822 051 20008	0R00	JUMP (0805)	
3792	4822 051 20008	0R00	JUMP (0805)	
3793	4822 051 20008	0R00	JUMP (0805)	
3794	4822 051 20008	0R00	JUMP (0805)	
3795	4822 051 20008	0R00	JUMP (0805)	
3796	4822 051 20008	0R00	JUMP (0805)	
3797	4822 051 20008	0R00	JUMP (0805)	

COILS

5700	4822 157 63717	6,8MµH
5703	4822 157 71206	BLM21A10
5704	4822 157 71206	BLM21A10
5705	4822 157 71206	BLM21A10
5706	4822 157 71206	BLM21A10
5707	4822 157 71206	BLM21A10

DIODES

6700	4822 130 10652	BB149
6701	4822 130 83757	BAS216

TRANSISTORS & IC's

7700	4822 209 14809	SAA7284Z
7701	5322 209 61487	LM358N

CABLES & SUB MODULS

CABLES

8001	4822 320 11889	FFC TD1-1961
8002	4822 323 10374	CABLE TREE TD2-1962
8003	4822 320 11891	FFC TD1-1944
8004	4822 320 11892	FFC TD4-1930
8005	4822 320 11888	FFC 1901-1945
8007	4822 320 11891	FFC 1710-1750
8008	4822 323 10373	ESD-GND CONN.
	⚠ 4822 321 10886	MAINS CORD (+FUSE) for UK
	⚠ 4822 321 10249	MAINS CORD
	4822 320 50377	ANTENNA cable
	4822 321 63002	SCART cable

SUB MODULS

	4822 214 12238	CINCH print rear
	4822 214 12248	QKP21 Shuttle print